# SUMMARY[1]

## S.1 BACKGROUND

### S.1.1 Previous NEPA Review and Litigation

Baja California Power, Inc. (hereafter referred to as Intergen), applied to the U.S. Department of Energy (DOE) for a Presidential permit on February 27, 2001, to construct a double-circuit, 230,000-volt (230-kV) transmission line across the U.S.-Mexico border. In a separate but similar application, Sempra Energy Resources (hereafter referred to as Sempra) requested a Presidential permit on March 7, 2001, also proposing to construct a double-circuit, 230-kV transmission line across the U.S.-Mexico border. Executive Order (E.O.) 10485 (September 9, 1953), as amended by E.O. 12038 (February 7, 1978), requires that a Presidential permit be issued by DOE before electric transmission facilities may be constructed, operated, maintained, or connected at the U.S. international border. Because of the similarities of these proposals, DOE decided to consider them together in a single environmental review.

DOE and the U.S. Department of Interior (DOI), Bureau of Land Management (BLM), originally determined that the appropriate level of National Environmental Policy Act (NEPA), 42 USC §§ 4321–4347, review for the Intergen and Sempra Presidential permit applications was an environmental assessment (EA). DOE and BLM prepared a single EA that assessed the potential impacts that would accrue in the United States from the two transmission lines and from operation of the two related power plants in Mexico. DOE and BLM completed and issued the EA in December 2001. DOE relied on the EA to issue a Finding of No Significant Impact (FONSI) and Presidential permits for both projects on December 5, 2001. BLM issued two FONSIs on December 19, 2001, and two Decision Records to grant the rights-of-way (ROWs) on December 20, 2001, which allowed Intergen and Sempra to construct and maintain transmission facilities on Federal land. Following the authorizations by DOE and BLM, Intergen and Sempra constructed the transmission lines and began commercial operation to export electricity from Mexico in July 2003.

On March 19, 2002, the Border Power Plant Working Group (hereafter referred to as Border Power) sued DOE and BLM in the United States District Court for the Southern District of California (Case No. 02-CV-513-IEG (POR)), alleging violations of NEPA and the Administrative Procedure Act. Border Power sought to have the EA, DOE's and BLM's FONSIs, the Presidential permits, and the ROW grants determined to be illegal and requested an injunction forbidding the use of the transmission lines. The District Court issued two orders in May and July of 2003, after briefings and arguments by the various parties. On May 2, 2003, the court held that the EA and the FONSIs did not comply with NEPA. On July 8, 2003, the court sent the matter back to DOE and BLM for additional environmental review. The court declined

[1] To the extent feasible, vertical lines in the right margin of this summary and the remainder of this EIS document indicate changes that have been added after the public comment period.

to enjoin operation of the transmission lines immediately; instead, it deferred the setting aside of the Presidential permits and the FONSIs until July 1, 2004, or until such time as superseding NEPA documents were issued, whichever was earlier. Thus, the transmission lines could operate while DOE and BLM conducted this additional NEPA review. In light of the concerns raised by the court and to increase opportunities for public and stakeholder participation in the environmental review process, DOE and BLM prepared this environmental impact statement (EIS). The court has twice extended a date for setting aside the permits; that date is now March 14, 2005.

In its July 8, 2003, order, the court expressly prohibited DOE and BLM from considering completion of construction and interim operation of the transmission lines or the court's analyses of environmental impacts of the proposed actions in conducting additional NEPA analyses. DOE and BLM interpreted this language as requiring that they conduct their NEPA review from a fresh slate, as if the transmission lines had not been built. Accordingly, DOE and BLM have based their EIS analysis on the same purpose and need as the EA: whether to grant or deny Presidential permits and ROWs to Intergen and Sempra. The discussion of the transmission lines (proposed) and the environmental analysis is presented as if the lines did not yet exist.

While the Draft EIS (DEIS) analyzed the alternative technologies alternative in terms of hypothetical, "to-be-built" plants, DOE and BLM now believe that the court ruling to treat the transmission lines as having never been built does not extend to the connected power plants. Such an assumption would limit DOE's and BLM's ability to perform an analysis of sufficient detail to fully support an effective evaluation of Alternative 3, which would be implemented in the context of a retrofit of alternative technologies to the existing plants.

### S.1.2 Project Overview

In each of these projects, the applicants would use the proposed international transmission lines to connect separate, new natural-gas-fired power plants in Mexico to the existing San Diego Gas & Electric (SDG&E) Imperial Valley (IV) Substation located about 6 mi (10 km) north of the border in Imperial County, California (Figure S-1). Within the United States, both transmission lines are proposed to be constructed on lands managed by the BLM, parallel and adjacent to the existing SDG&E 230-kV transmission line (IV-La Rosita line) that connects the IV Substation with Mexico's La Rosita Substation. Both Intergen and Sempra applied to BLM for ROW grants in order to be able to construct their respective projects across Federal land. Table S-1 is a time line for the projects that describes the milestones and sequences of events for construction and operation of the transmission lines and power plants. It also includes dates of DOE and BLM actions that pertain to the Presidential permit and grant of ROW approvals, and subsequent actions leading to the publication of this EIS.

**TABLE S-1 Time Line for Imperial-Mexicali 230-kV Transmission Lines**

| | Sempra (TDM) | | Intergen (LRPC) | |
|---|---|---|---|---|
| Date | Permits and Contracts | Construction and Operations | Permits and Contracts | Construction and Operations |
| **2000** | | | | |
| Jan. | Land Use and Zoning Permit | | | |
| June | | | Project bid for EAX awarded by CFE | |
| Aug. | | | MIA for EAX submitted for approval to SEMARNAT | |
| Nov. | | | • EPC contract for EAX signed<br>• MIA for EAX receives approval from SEMARNAT | |
| **2001** | | | | |
| Jan. | TDM receives approval of MIA from SEMARNAT | | | |
| Feb. | Sempra applies to BLM for ROWs | | • Intergen applies to DOE for Presidential permit<br>• Intergen applies to BLM for ROWs | |
| Mar. | Sempra applies to DOE for Presidential permit | | | • Construction of EAX and Sewage Treatment Plant at LRPC begins |
| Apr. | LNTP for power plant engineering | | • MIA for EBC submitted for approval to SEMARNAT<br>• EPC contract signed for EBC | |
| June | • CRE Import Permit<br>• Power plant EPC contract executed and Full Notice to Proceed | | EBC receives approval of MIA from SEMARNAT | |
| July | | | | EBC construction begins |
| Aug. | • CRE Export Permit | | | |
| Sept. | Transmission line EPC contract executed | Groundbreaking for power plant | | |
| Nov. | | Groundbreaking for transmission lines on Mexico side | | |
| Dec. | • DOE issues EA, FONSI, and Presidential permit to Sempra allowing interconnection of transmission lines at the U.S.-Mexico border<br>• BLM issues FONSIs and Decision Records to grant ROWs | | • DOE issues EA, FONSI, and Presidential permit to Intergen allowing interconnection of transmission lines at the U.S.-Mexico border<br>• BLM issues FONSIs and Decision Records to grant ROWs | |
| **2002** | | | | |
| Jan. | BLM transmission line ROW Notice to Proceed | • Groundbreaking for transmission lines on U.S. side | | |

**TABLE S-1 (Cont.)**

| | Sempra (TDM) | | Intergen (LRPC) | |
|---|---|---|---|---|
| Date | Permits and Contracts | Construction and Operations | Permits and Contracts | Construction and Operations |
| **2002 (Cont.)** | | | | |
| Feb. | U.S. International Boundary & Water Commission authorization | | | |
| Mar. | Complaint on Presidential permit filed with court | | Complaint on Presidential permit filed with court | |
| Apr. | CILA Permit | | | |
| Sept. | | | | Intergen places transmission line in service |
| Nov. | | Sempra places transmission line in service | | |
| **2003** | | | | |
| Feb. | | • Transmission line energized<br>• Power plant construction completed | | |
| May | • Court issues an order that the EA and FONSI do not comply with NEPA<br>• District court order grants and denies, in part, plaintiff's motion for summary judgment | | • Court issues an order that the EA and FONSI do not comply with NEPA<br>• District court order grants and denies, in part, plaintiff's motion for summary judgment | |
| July | • Court orders additional environmental analyses<br>• District court order denies plaintiff's specific requests for injunctive relief (allows plants to run pending further NEPA review) | Sempra begins commercial operation of TDM | • Court orders additional environmental analyses<br>• District court order denies plaintiff's specific requests for injunctive relief (allows plants to run pending further NEPA review) | • EAX begins commercial operation<br>• Intergen begins commercial operation of LRPC |
| Oct. | DOE publishes NOI to prepare an EIS | | | EBC begins commercial operation |
| Nov. | Public scoping meetings held in El Centro and Calexico, California | | Public scoping meetings held in El Centro and Calexico, California | |
| **2004** | | | | |
| Mar. | | | | Intergen completes installation of SCR on LR-1 export gas turbine |
| May | DOE issues Draft EIS | | DOE issues Draft EIS | |
| July | Public comment period on Draft EIS closes | | Public comment period on Draft EIS closes | |
| Dec. | DOE issues Final EIS | | DOE issues Final EIS | |

CFE = Federal Electricity Commission; CILA = Mexican Commission for Borders and Waters; CRE = Mexican Energy Regulatory Commission; EAX = Energiá Azteca X, S. de R.L. de C.V.; EBC = Energiá Baja California; EIS = environmental impact statement; EPC = engineering, procurement, and construction; INE = Instituto Nacional de Ecologia; LNTP = Limited Notice to Proceed; LRPC = La Rosita Power Complex; MIA = Manestifación de Ambientale; NOI = Notice of Intent; SCR = selective catalytic reduction; SEMARNAT = Secretaria De Medio Ambiente y Recursos Naturales; STP = sewage treatment plant; TDM = Termoeléctrica de Mexicali.

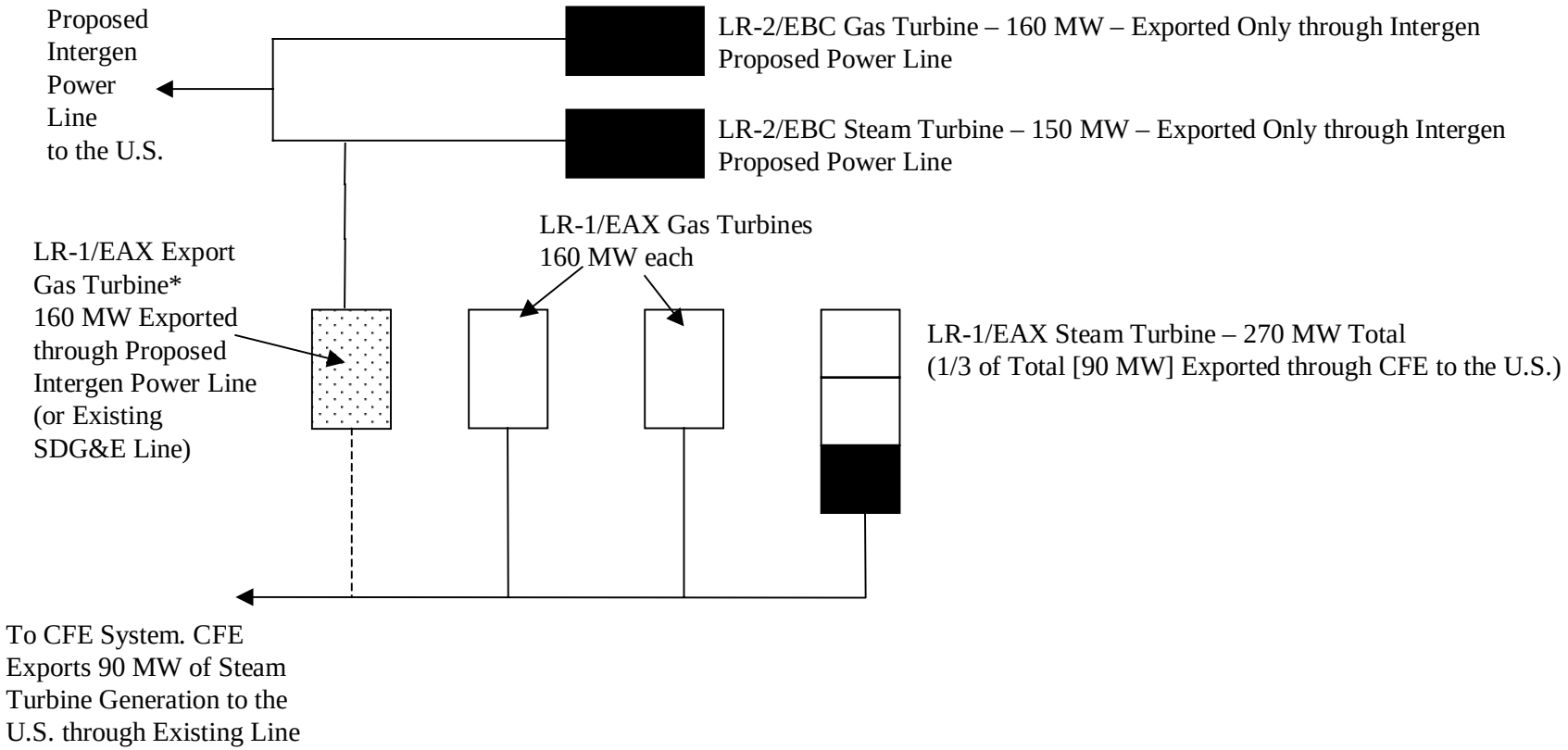
This EIS was prepared in accordance with Section 102(2)(c) of NEPA, Council of Environmental Quality (CEQ) regulations (40 *Code of Federal Regulations,* Title 40, Parts 1500–1508 [40 CFR Parts 1500–1508]), and DOE NEPA implementing procedures (10 CFR Part 1021). DOE is the lead Federal agency, as defined by 40 CFR 1501.5. BLM is a cooperating agency.

## S.1.3 Overview of Transmission Line Projects

### S.1.3.1 Intergen Transmission Line Project

Intergen proposed to construct and operate a double-circuit, 230-kV transmission line that would extend from the La Rosita Power Complex (LRPC), located about 10 mi (16 km) west of Mexicali, Mexico (Figure S-2), northward for approximately 3 mi (4.8 km) to the U.S.-Mexico border at a point west of Calexico, California. From the border, the line would extend about 6 mi (10 km) north across Federal land managed by BLM and terminate at the IV Substation. The LRPC consists of two natural-gas-fired combined-cycle generating units. One unit (LR-1) is owned by Energiá Azteca X, S. de R.L. de C.V. (EAX) and consists of three 160-MW gas turbines and one 270-MW steam turbine, for a total generating capacity of 750 MW. The second combined-cycle unit (LR-2) is owned by Energiá de Baja California (EBC) and consists of one 160-MW gas turbine and one 150-MW steam turbine, for a total generating capacity of 310 MW. The capacity of the entire LRPC is a nominal 1,060 MW (Figure S-3).

The electrical output of LR-2 is presently designated exclusively to the U.S. market and can be exported to the United States only over the proposed new international transmission line. The electrical output of one gas turbine (160 MW) at LR-1 and one-third (90 MW) of the electrical output of the LR-1 steam turbine (270 MW) are also designated for export to the U.S. market. However, the 160-MW electrical output of the LR-1 export gas turbine could now be transmitted to the United States over either the proposed new international transmission line or over the existing IV-La Rosita line owned by SDG&E. The 90-MW electrical output of the LR-1 steam turbine designated for export to the United States may be transmitted to the United States only over the existing IV-La Rosita line. In addition, there may be, at times, as much as 40 to 50 MW of additional output from the EAX plant that would be available for export over the existing IV-LaRosita line. Delivery of the electrical output of the export turbines would be scheduled by the California Independent System Operator (Cal-ISO). The remaining two EAX gas turbines and two-thirds of the electrical output of the EAX steam turbine are designated directly for the Mexico market and are connected to the Comisión Federal de Electricidad (CFE), the national electric utility of Mexico. Wastewater from the cooling towers would be discharged into the canal that flows into the New River at a point within 100 yd (91 m) of the border (see Figure S-8). The New River flows northward into the United States and terminates at the Sonny Bono Salton Sea National Wildlife Refuge.




*The electrical output of this gas turbine is designated primarily for export to the U.S., but may be a backup for either of the two CFE gas turbines. Normally, the electrical output of this turbine would be exported to the U.S. over the proposed new international transmission line. Under certain circumstances, the electrical output of this turbine could be directed onto the CFE system, which would then wheel the power to the U.S. over the existing SDG&E transmission line.

**FIGURE S-3 La Rosita Power Complex: Electrical Distribution**

To reduce nitrogen oxides ($NO_X$) emissions, all gas turbines at the LRPC have been equipped with dry low-$NO_X$ burners, and ultimately with selective catalytic reduction (SCR) systems. The EBC export gas turbine (310 MW) has been built with SCR. The EAX export turbine has also been equipped with SCR. Intergen has stated that the other two EAX gas turbines, those designed for the Mexico electricity market, will have SCR systems installed by March 2005. The combination of dry low-$NO_X$ burners and SCR will reduce $NO_X$ emissions to 4 parts per million (ppm). Carbon monoxide (CO) emissions are guaranteed by the gas turbine vendor to not exceed 30 ppm.

Cooling water for operation of the power plant is obtained from the inlet of the Zaragoza Oxidation Lagoons and treated before use.

### S.1.3.2 Sempra Transmission Line Project

Sempra proposed to construct a double-circuit, 230-kV transmission line that would extend from a natural-gas-fired power plant located 13 mi (21 km) west of Mexicali, Mexico, developed by Termoeléctrica de Mexicali (TDM), northward approximately 3 mi (4.8 km) to the U.S.-Mexico border west of Calexico, California. The line would parallel the existing IV-La Rosita line in the United States northward from the border, across Federal land managed by BLM, a distance of about 6 mi (10 km) to the IV Substation.

The power plant consists of one natural-gas-fired combined-cycle generating unit, with a nominal capacity of 650 MW. The unit consists of two 170-MW gas turbines and one 310-MW steam turbine. The power plant produces electricity exclusively for export to the United States that could be transmitted only over the proposed new transmission line. Delivery of the electrical output of the export turbines is scheduled by Cal-ISO.

The power plant is equipped with dry low-$NO_X$ burners and SCR systems to reduce $NO_X$ emissions to a maximum of 2.5 ppm, and an oxidizing catalyst system to reduce CO emissions to a maximum of 4 ppm.

Cooling water for operation of the power plant is obtained from the outlet of the Zaragoza Oxidation Lagoons and treated before use. Wastewater, which is discharged to the same canal as for the Intergen project, then flows into the New River, which flows northward into the United States.

## S.2 PURPOSE AND NEED

Intergen and Sempra each need approvals from BLM and DOE, respectively, to allow construction of the approximately 6 mi (10 km) of new 230-kV transmission lines in the United States and connection of the lines at the U.S.-Mexico border, with similar facilities in Mexico. DOE and BLM will use this Final EIS (FEIS) to ensure that they have the environmental information needed for purposes of informed decision making. The decisions will be issued subsequently in the form of separate Records of Decision (RODs) by DOE and BLM.

### S.2.1 DOE

DOE will use this EIS to determine whether it is in the public interest to grant Presidential permits to Sempra and Intergen for the construction, operation, maintenance, and connection of the proposed 230-kV transmission lines that would cross the U.S.-Mexico border. DOE's action responds to each applicant's request for a Presidential permit. DOE must comply with NEPA and, in this instance, is the lead Federal agency for NEPA compliance.

In determining whether a proposed action is in the public interest, DOE considers the impact of the proposed action on the environment and on the reliability of the U.S. electric power supply system. DOE also must obtain the concurrence of the Departments of State and Defense before it may grant a Presidential permit. If DOE determines that granting a Presidential permit is in the public interest, the information contained in the EIS will provide a basis upon which DOE decides which alternative(s) and mitigation measures, if any, are appropriate for the applicants to implement. In a process that is separate from NEPA, DOE will determine whether a proposed action will adversely impact the reliability of the U.S. electric system. Issuance of a Presidential permit only indicates that DOE has no objection to the project; it does not mandate that the project be completed.

Both the Sempra and Intergen proposed transmission lines would be used to export small amounts of electricity from the United States for the purpose of initial start-up and restarting of their respective power plants in the event of a plant shutdown. This is known as "black start." In order to export power from the United States, both companies must obtain separate export authorizations from DOE under Section 202(e) of the Federal Power Act. Before authorizing exports to Mexico over the proposed transmission lines, DOE must ensure that the export would not impair the sufficiency of the electric power supply within the United States and would not impede, or tend to impede, the coordinated use of the regional transmission system.

### S.2.2 BLM

BLM will use this EIS to determine whether to approve electric transmission line ROW requests for the projects proposed by Sempra and Intergen. To obtain the ROW approval, Sempra submitted an "Application for Transportation and Utility Systems and Facilities on Federal Lands" to BLM on February 13, 2001. The proposed ROW would be within Utility Corridor N (Figure S-2) of BLM's California Desert Conservation Area (CDCA) Plan. Intergen filed its application for ROW approval with BLM on February 26, 2001, also for use of a ROW in Utility Corridor N. The Sempra and Intergen transmission line ROWs would each be 120 ft (36 m) wide, and both are proposed to be located along the east side of the existing IV-La Rosita line. In reviewing the applications for ROW grants, BLM must consider land status, consistency with land use plans, affected resources, resource values, environmental conditions, and concerns of various interested parties. Complete guidance for implementing the NEPA process within BLM can be found in *H-1790-1 — National Environmental Policy Act Handbook* and DOI guidance.

These projects must be consistent with BLM's regional and local plans. The proposed projects fall within the CDCA. BLM administers a comprehensive land use management plan for this area, which is referred to as the CDCA Plan. The goal of the CDCA Plan is to provide for the educational, scientific, and recreational uses of public lands and resources within the CDCA in a manner that enhances and does not diminish the environmental, cultural, and aesthetic values of the desert and its productivity. According to the CDCA Plan, this goal is to be achieved through the direction given for management actions and resolution of conflicts. Direction is stated first on a geographic basis in guidelines set forth in each of four multiple-use classes. Within those guidelines, further refinement of direction is expressed in the goals for each CDCA Plan element (e.g., cultural resources, wildlife, vegetation, wilderness, recreation, motorized-vehicle access, geology, and energy production and utility corridors).

The proposed projects are located within an area designated as Multiple Use Class L (limited) in the CDCA Plan. Class L protects sensitive, natural, scenic, ecological, and cultural resource values. Public lands designated as Class L are managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished.

The CDCA Plan states that "applications for utility rights-of-way will be encouraged by BLM management to use designated corridors." The proposed projects are consistent with the CDCA Plan because they are located entirely within a designated utility corridor (N). Utility applications that do not conform to the corridor system would require a plan amendment.

The project area for the proposed transmission lines is located in the Yuha Basin Area of Critical Environmental Concern (ACEC), as designated by the CDCA Plan. The Yuha Basin ACEC Management Plan was prepared to give additional protection to unique cultural resource and wildlife values found in the region while also providing for multiple use management. The ACEC Management Plan allows for the "traversing of the ACEC by proposed transmission lines and associated facilities if environmental analysis demonstrates that it is environmentally sound to do so."

The *Flat-tailed Horned Lizard Rangewide Management Strategy* (hereafter referred to as the Strategy) was prepared to provide guidance for the conservation and management of sufficient habitat to maintain extant populations of flat-tailed horned lizards, a BLM-designated sensitive species. A major step toward that objective was the establishment of five flat-tailed horned lizard Management Areas. The project area is within the Yuha Desert Management Area. The Strategy encourages surface-disturbing projects to be located outside of Management Areas. However, it does not preclude such projects from the Management Area. If a project must be located within a Management Area, effort should be made to locate the project in a previously disturbed area or in an area where habitat quality is poor, and the project should be timed to minimize mortality. The applicants have agreed to accept all applicable mitigation measures identified in the Strategy.

### S.2.3 Applicants' Purpose and Need

The Sempra and Intergen Presidential permit applications each described a need for their 230-kV transmission lines to transport electric power generated by the Mexico power plants to the United States. In its application, Sempra indicated that all power generated by its proposed Mexico power plant would be exported to the United States to "reduce the region's dependence upon conventional oil-burning generation plants, and improve the region's ability to meet future electrical capacity and energy requirements."

In its application, Intergen stated it would utilize its 230-kV transmission line to export 310 MW from its EBC unit and 250 MW from its EAX unit to the United States. Intergen stated that this would reduce the need for power producers in southern California to build new oil- or gas-fired generation facilities, provide additional reserve capacity to California, and improve system reliability.

## S.3 PUBLIC PARTICIPATION AND THE NEPA PROCESS

### S.3.1 Public Scoping and Comment Period

The "Notice of Intent to Prepare an Environmental Impact Statement (EIS) and to Conduct Public Scoping Meetings and Notice of Floodplain and Wetlands Involvement" was published in the *Federal Register* (Volume 68, page 61796 [68 FR 61796]) on October 30, 2003. Announcements were also placed in local newspapers. A project Web site maintained for DOE (http://web.ead.anl.gov/bajatermoeis) provides background information on the proposed projects, including previous NEPA review and DOE's NEPA process. DOE and BLM held public scoping meetings at two California locations on November 20, 2003 — the City Hall of El Centro and the City of Calexico City Hall. A total of 20 individuals presented oral comments at the two public scoping meetings. Written comments were also solicited. Seventeen individuals submitted written comments during the scoping period, which closed on December 1, 2003.

#### S.3.1.1 Issues within the Scope of the EIS

The issues described below were raised by commentors during scoping and were addressed in the DEIS.

Several commentors suggested that operation of the natural-gas-fired power plants in Mexico would have adverse impacts on water volume and water quality of the New River and the Salton Sea and water availability to the Imperial Valley in California. Specific issues included impacts to the New River caused by an increase in temperature, the increase in total dissolved solids (TDS), and the reduction of dissolved oxygen (DO).

Many commentors were concerned that the two power plants would lead to further degradation of air quality in the region. Imperial County is classified as nonattainment for particulate matter with an aerodynamic diameter of 10 μm or less ($PM_{10}$) and ozone ($O_3$). Specifically, issues were raised about possible increases in $NO_x$, CO, $O_3$, and particulate matter (both $PM_{2.5}$ and $PM_{10}$) that would be caused by power plant operations. Commentors questioned the assumptions for the ammonia ($NH_3$) concentrations released at the plants used in calculations of secondary $PM_{10}$ generation. One commentor suggested that the air samples taken at the border do not reflect maximum exposure concentrations and requested that stack heights and proximity to the border of the power plants be taken into consideration when estimating air emission concentrations.

There were several requests that a comprehensive health risk assessment related to air pollution be conducted as part of the EIS process. Appendix H contains a health risk assessment.

Many commentors were concerned about human health impacts from the power plants. Individuals expressed concern over possible effects of emissions on incidences of asthma in the Imperial Valley.

Many commentors expressed the need for the EIS to discuss mitigation measures to offset impacts from power plant operations, mainly related to air emissions. Suggestions included establishing a mitigation fund, identifying offsets (ways to reduce air emission amounts from other sources to compensate for emissions from the power plants in Mexico and in the United States), and completing projects to mitigate impacts from power plant operations.

Commentors raised issues related to alternative technologies that could be used at the power plants to reduce water use in plant cooling and air emissions from the facilities. Issues included the use of dry cooling or a combination of wet-dry cooling to reduce water required for plant operation, installation of CO controls and SCR systems on all power plant units, and use of best available technology to reduce air emissions.

Ecological concerns raised by commentors related to transmission line construction and operation included potential impacts to endangered species and suggestions that birds protected by the Migratory Bird Treaty Act be addressed in the impact analysis. Issues raised related to aquatic habitats included salinity increases in the New River and Salton Sea, potential effects on fish and bird populations in the Salton Sea, and water quality degradation that would affect recreational fishing in the Salton Sea.

Commentors suggested that the EIS examine the visual impact of the two new transmission lines, and that the EIS analysis address the potential effects of the projects on tourism and recreational fishing in the Salton Sea. Environmental justice was raised as an issue by a commentor who stated that the new power plants could affect low-income populations. One commentor requested that the EIS address impacts of the project on cultural resources.

### S.3.1.2 Issues outside the Scope of the EIS

The issues below were raised by commentors during scoping, and DOE has determined that they are outside the scope of the DEIS and the FEIS.

Several commentors asked DOE and BLM to evaluate the impacts associated with the power plants on the environment in Mexico, not just in the United States. The agencies do not agree that such an analysis is appropriate for the following reasons.

NEPA does not require an analysis of environmental impacts that occur within another sovereign nation that result from approved actions by that sovereign nation. E.O. 12114 (44 FR 1957; January 4, 1979) requires Federal agencies to prepare an analysis of significant impacts from a Federal action in certain defined circumstances and exempts agencies from preparing analyses in others. The Order does not require Federal agencies to evaluate impacts outside the United States when the foreign nation is participating with the United States or is otherwise involved in the action [Section 2-3(b)]. Here, the Mexico government has been involved in evaluating the environmental impacts associated with the power plants in Mexico and had issued permits authorizing the construction and operation of the two power plants and ancillary facilities. An overview of the permitting of the power plants and associated environmental impacts analysis that was performed by the Mexico government has been added to the EIS as Appendix J. In addition, the Federal action does not affect the global commons (e.g., outer space or Antarctica), and the Federal action does not produce a product, emission, or effluent that is "prohibited or strictly regulated by Federal law in the United States because its toxic effects on the environment create a serious public health risk," or which involves regulated or prohibited radioactive materials.

Several commentors suggested that the Intergen and Sempra applications for Presidential permits, construction of the two power plants in Mexico, and approval of the North Baja Pipeline, LLC, by the Federal Energy Regulatory Commission (FERC) are related actions and should be assessed as a single undertaking because the power plants would burn natural gas supplied by the pipeline. While the transmission lines and pipeline are related and complementary in that they would facilitate the operation of the electricity-generating facilities in Mexico, they are independent actions that serve distinct functions and that can proceed separately. Intergen and Sempra stated that if FERC had chosen not to grant a Presidential permit for the gas pipeline, the power plants would operate by using alternate fuel sources. North Baja Pipeline, LLC, submitted information to FERC indicating that the gas pipeline would be a viable project even without the Intergen and Sempra power plants.

One commentor suggested that a 50-year comprehensive cumulative impact assessment be conducted as part of the EIS. This EIS does contain a cumulative impact analysis. CEQ guidance on conducting cumulative impact assessments states that projects be reasonably foreseeable. DOE and BLM believe that for purposes of estimating cumulative impacts, reasonably foreseeable projects are generally projects to be executed within the next 10 years. Projects predicted to occur beyond 10 years are generally presumed to be speculative and thus not reasonably foreseeable.

A commentor requested that a national policy be developed to define the minimum distance that transmission lines can be constructed relative to gas pipelines. It is not the purpose of this EIS to consider such a national policy; therefore, this issue is outside the scope of the EIS.

Commentors requested that information pertaining to emergency outage plans and homeland security issues be examined as part of the EIS. The development of emergency outage response plans is the purview of local public safety officials and is outside the scope of the EIS. The proposed transmission lines and power plants present no greater target for terrorists than any other high-voltage transmission lines or power plants in the United States. Also, outside of the NEPA process, DOE will perform an electric reliability study to ensure that the existing U.S. power supply system would remain fully operational upon the sudden loss of power, regardless of the cause of the outage.

### S.3.2 Public Review of the DEIS

On May 14, 2004, the U.S. Environmental Protection Agency (EPA) published a Notice of Availability in the *Federal Register* (69 FR 26817) for the DEIS evaluating the impacts in the United States of constructing, connecting, and operating and maintaining two transmission lines from two power plants in Mexico. In accordance with CEQ and DOE NEPA regulations, the DEIS was distributed to interested agencies, organizations, and the general public to allow them to provide oral and written comments. It was also made available in its entirety on the project Web site (http://web.ead.anl.gov/bajatermoeis/index.cfm). E-mail notification was sent to those on the project Web site mailing list. The May 14, 2004, date marked the beginning of a 45-day comment period, which was to end on June 19, 2004. However, at the request of the plaintiff (Border Power), the comment period was extended to July 30, 2004. (A Notice of Comment Period Extension was published in the *Federal Register* on May 26, 2004 [69 FR 29934].) To facilitate public involvement, stakeholders could submit comments on the DEIS via telephone, letter, e-mail, or the project Web site.

DOE and BLM held two public hearings during the review period in the City Halls at El Centro, California (11:00 a.m. to 1:00 p.m.), and Calexico, California (6:00 p.m. to 8:00 p.m.), on July 14, 2004. The dates and times of the public hearings were announced on the project Web site and in local newspapers. The hearings on the DEIS were an important component in the agencies' continuing efforts to provide the public with opportunities to participate in the decision-making process. The hearings included a presentation by DOE, a question and answer period, and an oral comment session where reviewers were invited to formally enter their comments into the public record. In all, 26 individuals testified at the hearings. Transcripts of the public hearing proceedings were recorded by a court reporter and are available on the project Web site and in this EIS (Chapter 2 of Volume 2).

DOE received 4,804 comment submissions. These comments came from individuals, Federal and State agencies, local governments, and nongovernmental organizations such as environmental groups. All but 108 of these were campaign letters. An index of the commentors, copies of the actual letters or other documents containing public comments submitted to DOE (including comments identified in the transcripts), a summary of key issues in response

to comments, and specific responses to each comment received are provided in Volume 2 of this EIS.

Comments on the DEIS were received by e-mail, fax, mail, or as oral statements at one of the public hearings from individuals, nongovernmental organizations, and government agencies. This resulted in 113 comment documents: 26 from the hearings, 5 representative campaign letters, and 82 from individuals or organizations. The vast majority (98%) of commentors submitted a campaign letter. DOE has responded to each of the oral and written comments, including the campaign letters.

While reviewing the comments, DOE identified 18 key issues that it believes reflect major concerns related to the EIS:

1. Extension of NEPA analysis into Mexico;

2. Use of significant impact levels (SLs) to evaluate impacts on air quality and human health;

3. The conditioning of permits, enforcement of emission levels;

4. Definition of the alternatives with regard to the three LRPC EAX gas turbines; and inclusion of the EAX-export unit in both the proposed action and no action alternatives;

5. Analysis of power plant impacts for all alternatives in terms of the existing plants rather than the hypothetical, "to-be-built" plants analyzed in the DEIS;

6. Analysis of dry and parallel wet-dry cooling;

7. Scope of the EIS with respect to the gas pipeline that supplies the power plants;

8. Characterization of air quality in terms of ambient air quality standards and exceedances;

9. Estimating additional violations of ambient air quality standards in Imperial County resulting from plant emissions;

10. Estimation of secondary $PM_{10}$ from plant $NH_3$ and $NO_x$ emissions;

11. Characterization of $O_3$ and $PM_{10}$ episodes in Imperial County;

12. Discussion of the uncertainty and sensitivity of the DEIS ozone analysis using the EPA's $O_3$ Ozone Isopleth Plotting Program Revised (OZIPR) methodology; and description of the methodology;

13. Estimates of additional adverse health impacts;

14. Documentation of TDS removal in power plant water treatment systems;

15. Analysis of power plant impacts on the regional 4,000-mg/L TDS surface water objective;

16. The use of the second circuits on the respective transmission lines;

17. The applicability of conformity review to direct $PM_{10}$ emissions from the Mexico power plants and to indirect $PM_{10}$ emissions from dry lakebed at the Salton Sea exposed as a result of consumptive water use at these plants; and

18. Conservatism in the analysis and interpretation of impacts.

As noted above, many revisions were made to the DEIS on the basis of the comments received. Although a good portion of the changes were made to provide clarification and additional detail, the more substantial changes pertained to the impacts analyses for water resources and air quality. The changes made in response to public comments did not affect the overall significance of the environmental impacts presented in this DEIS.

## S.4 ALTERNATIVES ANALYZED

The following alternatives are analyzed in this EIS:

1. No Action: Deny both permit and corresponding ROW applications. This presents the environmental impacts in the United States as if the lines had never been constructed and provides a baseline against which the impacts in the United States of the action alternatives can be measured in the absence of Presidential permits and corresponding ROWs.

2. Proposed Action: Grant one or both permits and corresponding ROWs. This sets forth the impacts in the United States of constructing and operating the line(s) from the Mexico power plants as those plants are presently designed.

3. Alternative Technologies: Grant one or both permits and corresponding ROWs to authorize transmission lines that connect to power plants that would employ more efficient emissions controls and alternative cooling technologies.

4. Mitigation Measures: Grant one or both permits and corresponding ROWs to authorize transmission lines whose developers would employ off-site mitigation measures to minimize environmental impacts in the United States.

DOE's and BLM's preferred alternative is to grant Presidential permits and ROWs to both Sempra and Intergen as their projects are presently designed.

DOE and BLM also consider alternative routes for the transmission lines within the United States under the action alternatives described above.

### S.4.1 No Action

Under the no action alternative, neither of the proposed transmission lines would be constructed, and the environmental impacts associated with their construction and operation would not occur. In the case of Sempra, lack of the requested transmission line would preclude the TDM power plant from operating because there would be no delivery path for the electricity generated. Similarly, in the case of Intergen, the EBC export unit could not operate because the proposed transmission line would have provided the only delivery path for the electricity generated from that unit.

However, the EAX unit at the LRPC could still operate. The existing SDG&E transmission line has sufficient capacity to transmit the electrical output of the EAX export gas turbine and one-third (90 MW) of the EAX steam turbine output to the United States. The other two EAX gas turbines and the remaining two-thirds (180 MW) of the electrical output of the EAX steam turbine are designated for the Mexico market and would operate under any and all circumstances.

Because DOE and BLM are proceeding with this EIS under the assumption that the proposed Intergen and Sempra transmission lines do not exist, this EIS does not address the removal of their lines and support structures from BLM lands. Should the Presidential permits and ROWs not be granted, the issue of whether to remove the existing lines from BLM lands would be a new Federal action subject to an appropriate separate NEPA review.

### S.4.2 Proposed Action: Grant One or Both Presidential Permits and Corresponding ROWs

Under the proposed action alternative, one or both of the Sempra and Intergen transmission lines would be constructed and operated, and all generating units at the TDM and LRPC power plants would be able to operate. DOE's and BLM's preferred alternative would be to issue both Presidential permits and ROWs to Sempra and Intergen as their projects are presently designed.

The impacts in the United States attributable to this alternative would be those associated with operation of the entire TDM power plant, the EBC unit, the EAX export turbine, and the construction and operation of the proposed transmission lines. If the proposed Intergen transmission line was approved and constructed, the electrical output of the EAX export turbine at the LRPC would be exported to the United States over that line. Therefore, even though the

EAX export turbine would be able to operate under the no action alternative, the impacts associated with this turbine are also included in the proposed action.

### S.4.2.1 Descriptions of Proposed Transmission Lines

The proposed transmission lines would be located in the Yuha Basin in the Colorado Desert in the southwestern portion of Imperial County, California, about 10 to 12 mi (16 to 18 km) southwest of the town of El Centro (Figure S-2). Each proposed project would construct a double-circuit, 230-kV transmission line extending from the existing IV Substation south approximately 6 mi (10 km) to the U.S.-Mexico border in BLM-designated Utility Corridor N, where each line would connect with a corresponding transmission line in Mexico. The transmission line support structures would consist of steel lattice towers from the border to just south of the IV Substation, where steel A-frame structures would be used for each transmission line to allow the crossing of the Southwest Power Link. The Southwest Power Link is a 500-kV transmission line that enters the IV Substation from the east at the substation's southeast corner. After crossing the Southwest Power Link, the proposed transmission lines would be supported by steel monopoles along the east side of the IV Substation and would enter it from the north.

From the U.S.-Mexico border to the last tower south of the Southwest Power Link at the IV Substation, both the Intergen and Sempra ROWs would parallel SDG&E's existing line. The ROW for the Intergen transmission line would be adjacent to the existing 120-ft (37-m) ROW for the existing SDG&E transmission line and would also be 120 ft (37 m) wide, so that the centerline would be 120 ft (37 m) east of the centerline of the existing transmission line ROW. The centerline of the Sempra ROW would be east of and adjacent to the proposed Intergen transmission line ROW and would be 120 ft (37 m) wide. Thus, the centerline of the Sempra ROW would be 120 ft (37 m) east of the centerline of the proposed Intergen ROW and 240 ft (73 m) east of the centerline of the existing line.

For both the Intergen and Sempra transmission lines, steel lattice towers would be erected on the centerlines of the ROWs. The towers would be spaced approximately 900 to 1,100 ft (274 to 335 m) apart and would be roughly in line with the existing line's towers in an east-west direction. In this EIS, the towers, A-frames, and steel poles for both lines are referred to by consecutive numbers from south to north; Tower No. 1 would be the first tower north of the U.S.-Mexico border, and Tower No. 24 would be just south of the IV Substation. Similarly, the steel monopoles are referred to by consecutive numbers from south to north of the substation, with the A-frame crossing structures included in the pole numbering system as No. 2 and No. 3.

**Transmission Line Construction.** Sempra and Intergen would use the same contractor to build both transmission lines simultaneously. Construction would begin with site preparation, consisting of grading of access roads, where necessary, and drilling or excavation for support structures and footings. Support structures would be fabricated in segments by the same vendor in Mexico. Each lattice tower and A-frame structure would be carried to the construction site by helicopter, which would minimize the amount of lay-down area required in the United States. Monopoles would be brought to the site in sections by truck, assembled in lay-down areas, and lifted into place with a crane. Principal preparation at each support structure location would

consist of preparing concrete foundation footings. Each tower would require four footings, one on each corner; a single footing would be needed for each monopole.

Three types of steel lattice transmission towers and two types of steel monopoles would be used, depending on function. The three types of steel lattice towers are suspension, deflection, and dead-end; the two types of steel monopoles are suspension and deflection. Suspension towers (or monopoles) are used where cables are strung in a straight line from one tower to an adjacent one. Deflection towers (or monopoles) are used where transmission lines turn at gradual angles, and dead-end lattice towers are used where transmission lines turn at large angles or where a transmission line is brought into an electric substation. Suspension, deflection, and dead-end towers are about 140 ft (43 m) high, and both deflection and suspension monopoles are about 102 ft (31 m) high.

Conductors (wires) on the dead-end and deflection towers or poles would be supported by double insulators. Conductors on suspension towers or poles would be supported by single insulators. The minimum ground clearance of the conductors would be 36 ft (11 m). The average horizontal distance between circuits for phase conductor spacing on steel lattice suspension and deflection towers would be approximately 35 ft (10.7 m). For dead-end steel lattice towers, the distance would be about 50 ft (15.2 m). The horizontal distance between phases on the steel monopoles would be about 26 ft (8.0 m) for the suspension monopole and 37.6 ft (11.5 m) for the deflection monopole. Vertical spacing between phases on a steel lattice tower would be between 21.3 and 26.4 ft (6.5 and 8.0 m), depending upon the tower type. Vertical spacing between phases on steel monopoles would be 18.0 ft (5.5 m) for both monopole types.

Each support structure would contain two electrical circuits. Each electrical circuit consists of three phases, with two unbundled conductors making up each phase. Two static ground wires would be located at the top of each support structure. These static ground wires would provide communications, system protection, and monitoring. The two ground static wires would include the installation of communications fiber for system protection and monitoring, with additional black fiber for future communications use. Therefore, each proposed transmission line would consist of 14 wires; that is, 12 conductors and the 2 static ground wires.

The conductors would be composed of strands of aluminum wire wrapped around a stranded steel cable. The aluminum conducts electricity and the steel supports the conductor. This type of construction is known as aluminum conductor steel-supported. Each conductor wire has a core of 7 steel wires surrounded by 54 aluminum wires.

The towers would be anchored to concrete foundations at each of the four corners at the base of the tower. The tower base dimensions would range from approximately 30 ft by 30 ft (9.1 m by 9.1 m) for suspension towers, to 40 ft by 40 ft (12.2 m by 12.2 m) for the deflection and dead-end towers. At the top, the suspension towers would be approximately 6.6 ft (2.0 m) square, the deflection towers would be approximately 7.5 ft (2.3 m) square, and the dead-end towers would be approximately 13 ft (4 m) square.

Steel suspension monopoles would be approximately 2.5 ft (0.8 m) in diameter at the base, tapering to approximately 1 ft (0.3 m) in diameter at the top. Steel deflection monopoles

would be approximately 4.8 ft (1.5 m) in diameter at the base, tapering to approximately 2.1 ft (0.6 m) at the top. Steel monopoles would be anchored to a concrete foundation.

Each of the four legs of the A-frame structures used to cross the Southwest Power Link would be bolted to a cylindrical concrete footing. A total of 32 footings would be needed for the four A-frames, with two A-frame structures on each side of the Southwest Power Link.

Once support structures are in place, conductors would be strung for the entire length of the transmission lines, from the northernmost support structure at the substation. Truck-mounted cable-pulling equipment would be used to string the conductors on the support structures. Cables would be pulled through one segment of a transmission line, with each segment containing several towers or poles. To pull cables, truck-mounted cable-pulling equipment would be placed alongside the tower or monopole, directly beneath the crossarm insulators (the "pull site") at the first and last towers or poles in the segment of the transmission line. The conductors would be pulled through the segment of line and attached to the insulators. Then the equipment would be moved to the next segment, with the "front-end" pull site just used becoming the "back-end" pull site for the next segment.

At the crossing structure south of the Southwest Power Link, the static wires would be brought down the structure, placed in a trench to pass to the other side of the Southwest Power Link, and brought back up the crossing structure on the other side. The trench would be backfilled.

Construction would be completed by restoring disturbed ground surfaces to original contours. Spoil dirt excavated for the footings would be spread on the ground, on access roads, or taken off site for disposal in a permitted disposal site.

**Areas of Construction Impact.** Areas of permanent impact would be those areas where the surface of the ground would be permanently disturbed. Specifically, permanent impacts would occur where new access roads and footings or anchors for tower, monopole, or crossing structures are constructed. Temporary impacts would occur in areas where construction activity takes place but where restoration of the surface is possible. These areas would include the work areas used to erect the towers, monopoles, or crossing structures; pull sites; lay-down areas for the monopoles; and the trenches for the optical cables under the Southwest Power Link at the substation. In some places, areas of temporary disturbance would overlap.

Many areas of temporary disturbance, such as work areas around towers or poles and pull sites, would overlap at least partially; consequently, the total estimate for the temporary impact areas is overestimated and therefore conservative.

The areas of impact, permanent and temporary, from construction of the proposed project are presented in Table S-2.

**TABLE S-2 Areas of Construction Impact**

| Impact Location | Size of Impact (acres)[a] Temporary | Permanent |
|---|---|---|
| Lattice tower footing | NA[b] | 0.23 |
| Lattice tower access roads | NA | 1.72 |
| Lattice suspension tower work areas | 2.46 | NA |
| Lattice deflection tower work areas | 0.88 | NA |
| Lattice tower pull sites | 0.83 | NA |
| Area of substation impact[c] | 9.5 | NA |
| Monopole pull sites and work areas | 0.48 | NA |
| Monopole lay-down areas | 1.21 | NA |
| Optical line trenches | 0.06 | NA |
| Crossing structures footing | NA | <0.05 |
| Monopole footings | NA | <0.04 |
| Monopole access roads | NA | 1.56 |
| Total | 15.42 | <3.60 |

[a] Based on a total of 25 towers (the actual number built is 24); thus, the actual disturbance would be less than that shown here. To convert acres to hectares, multiply by 0.4047.

[b] NA = not applicable.

[c] The work area near the IV Substation would be subject to intensive disturbance. It is likely, however, that not all of this area would be disturbed.

**Operations and Maintenance.** Operations and maintenance requirements would include, but not necessarily be limited to, the following: (1) yearly maintenance grading of access roads; (2) insulator washing; (3) monthly on-ground inspection of towers, poles, and access roads by vehicle; (4) air or ground inspection as needed; (5) repair of tower or pole components as needed; (6) repair or replacement of lines as needed; (7) replacement of insulators as needed; (8) painting of pole or tower identification markings or corroded areas on towers or poles; and (9) response to emergency situations (e.g., outages) as needed to restore power.

For most of these operations, equipment could use the access roads and no significant additional disturbance would occur. Transmission line conductors may occasionally need to be upgraded or replaced over the life of the line. Old cables would be taken down, and new cables would be strung on the insulators in an operation similar to the cable-pulling operation used to initially install the conductors. While the project access roads could be used for access, pull sites would also be required. The size and location of these pull sites may vary, depending on the cable and equipment used, the methods used by the contractor, and the technology available at the time. For these reasons, the size and location of future temporary disturbance areas due to

pull sites cannot be accurately estimated. In any event, such conductor replacement would be infrequent.

A typical steel lattice tower and monopole structure are shown in Figure S-4.

### S.4.2.2 Alternative Transmission Line Routes

The identification of potential transmission line routes includes routes on Federal and private lands that would connect the IV Substation with lines from Mexico at the U.S.-Mexico border. BLM lands extend more than 20 mi (32 km) to the west of the existing 230-kV IV-La Rosita transmission line (hereafter, existing line) route, and private lands are within 1 or 2 mi (2 or 3 km) of the route to the east. Utility Corridor N, designated in the BLM CDCA Plan, is identified as an appropriate location for utility lines. This corridor also allows a more direct route between the IV Substation in the United States and the La Rosita Substation in Mexico. Two alternative transmission routes to the applicants' proposed routes are evaluated in this EIS. A third alternative route located primarily on private land east of the existing line was considered but not evaluated for the reasons given below.

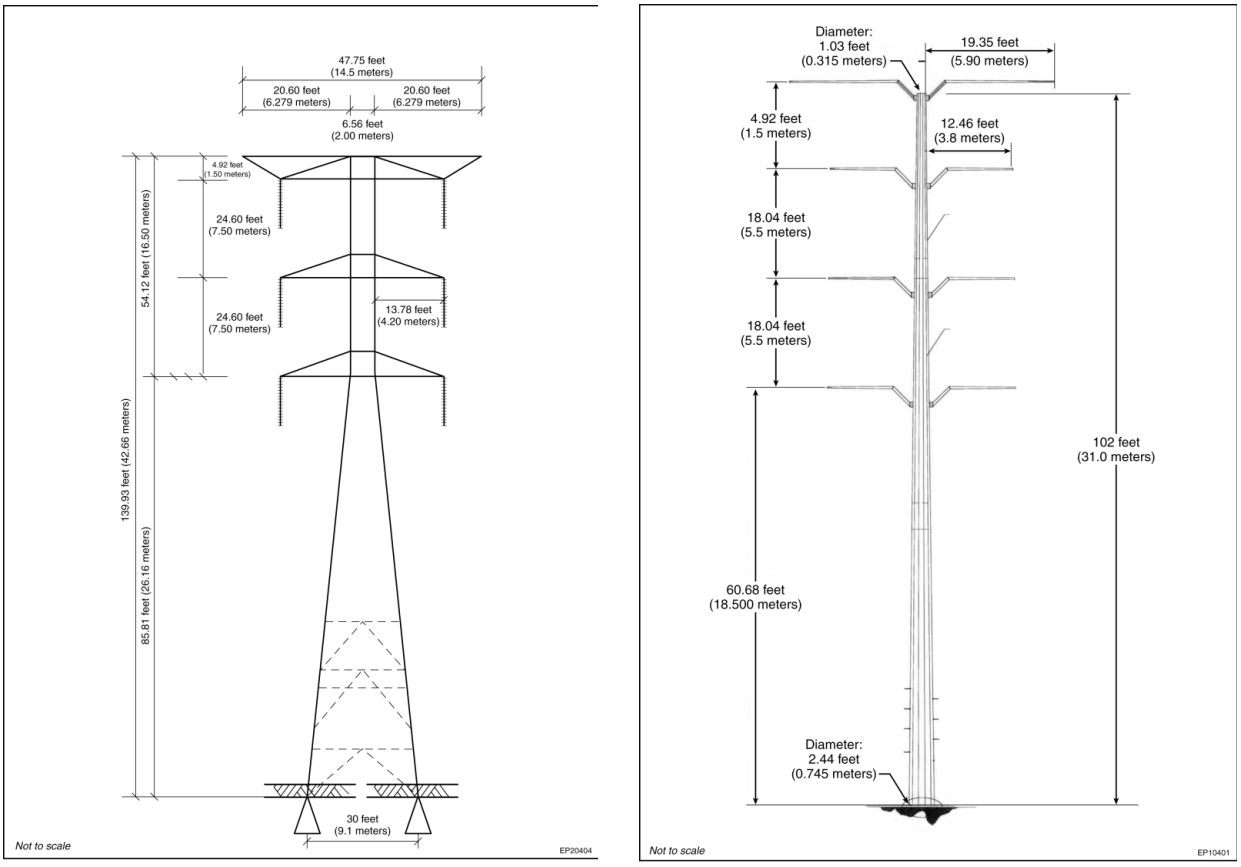



**FIGURE S-4 Suspension Tower (left) and Suspension Monopole (right)**

The end point and start point of each alternative route are at a fixed geographical location, namely the IV Substation to the north and the U.S.-Mexico border immediately east of where the existing line crosses the U.S.-Mexico border. The proposed routes represent a relatively direct path between these points.

The proposed and two alternative transmission line routes are shown in Figure S-5.

**West of the Existing 230-kV Transmission Line.** An alternative route west of the existing 230-kV IV-La Rosita transmission line is evaluated. The location of the western route was selected to minimize the amount of land with sensitive cultural resources that would have to be crossed by the transmission lines. This route would require about 7.4 mi (11.9 km) more of ROW entirely on BLM land. The southern portion of this route would extend to the west, outside of BLM-designated Utility Corridor N.

**East of the Existing 230-kV Transmission Line.** An alternative route east of the existing line on the eastern boundary of BLM-managed land is also analyzed. The rationale for selecting the location of this route was to avoid concentrations of archaeological resources along the former shorelines of Lake Cahuilla and also to attempt to reduce biological effects by constructing the lines on the border of the Yuha Basin ACEC rather than through it. The eastern alternative route would require about 5.8 mi (9.3 km) more of ROW. This location, like the applicants' proposed routes, would remain entirely on BLM land within Utility Corridor N.

**Outside Federal Lands.** An additional alternative route was considered in which the transmission lines would be located primarily on private lands located east of BLM-designated Utility Corridor N. To reach the IV Substation, this alternative route would traverse a little more than a mile in Federal lands.

Routing the transmission lines through private land to the east would require a considerably longer route than the more direct eastern, western, and applicants' proposed routes. Such a route would be more costly to construct and would result in a greater amount of ground disturbance than the other proposed routes. A larger number of towers would be required to be constructed, expanding any area temporarily or permanently impacted by construction; also, more materials, fuels, and expendables would be consumed.

Most important, private lands to the east are being used for agriculture. Any such alternative route would displace some agricultural land under towers and/or around poles and create conflicts with aerial crop dusting and other agricultural practices. Further, the acquisition of ROWs on private land would prove difficult to justify with regard to a variety of issues, including economic, environmental, and resource consumption, and it would be regarded as an unnecessary impingement on valued land when less expensive, shorter, and less intrusive routes are available on Federal lands through an existing, predesignated utility corridor.

This alternative route was not considered to be reasonable; no substantive advantage could be discerned to weigh against its considerable disadvantages; therefore, it was not analyzed further.

### S.4.2.3 Applicants' Proposed Environmental Protection Measures

Several features of the projects' design and construction methods are intended to reduce the amount of surface disturbance and therefore the potential impacts on environmental resources. These include locating the support structures (steel lattice towers, crossing structures, and steel monopoles) so that new access roads can be kept as short as possible; using existing access roads to the maximum extent possible; and using a helicopter to place lattice tower assemblies onto footings to reduce the amount of ground disturbance that would otherwise be caused by the use of lay-down areas and operation of cranes. In addition, the applicants would hire the same construction contractor to build both lines, further minimizing impacts by combining and coordinating construction activity, eliminating potential repeated impacts to the same area, and minimizing traffic flows.

The applicants would commit to stringent monitoring and mitigation requirements to protect biological, cultural, and paleontological resources.

### S.4.2.4 Project-Related Power Plants

All generating units at both power plants operate in a combined-cycle mode and are fueled by natural gas supplied by a cross-border pipeline previously permitted by FERC. Figure S-6 is a schematic showing the general engineering features of the TDM and LRPC power plants. Electricity is produced by both the gas turbines and the steam turbine generators. Exhaust gases from the gas turbine are cleaned up during their travel through the heat recovery steam generator. Heat from the gas turbine exhaust, which would otherwise be released to the atmosphere with exhaust gases, is recovered by the heat recovery steam generator to produce steam, which in turn is used by the steam turbine to generate additional electricity.

**La Rosita Power Complex**

***EAX:***

- 3 Siemens-Westinghouse Model W501F combustion turbines
- Alstrom steam turbine
- Doosan heat recovery steam generator

***EBC:***

- 1 Siemens-Westinghouse Model W501F combustion turbine
- Alstrom steam turbine
- Foster Wheeler heat recovery steam generator

**Termoeléctrica de Mexicali Power Plant**

- 2 General Electric Model 7FA combustion turbines
- Alsthom steam turbine
- Cerrey heat recovery steam generator

All turbines at both power plants are equipped with dry low-$NO_X$ burners that control emissions of $NO_X$ during combustion. All turbines at both power plants would also eventually utilize an SCR system to further

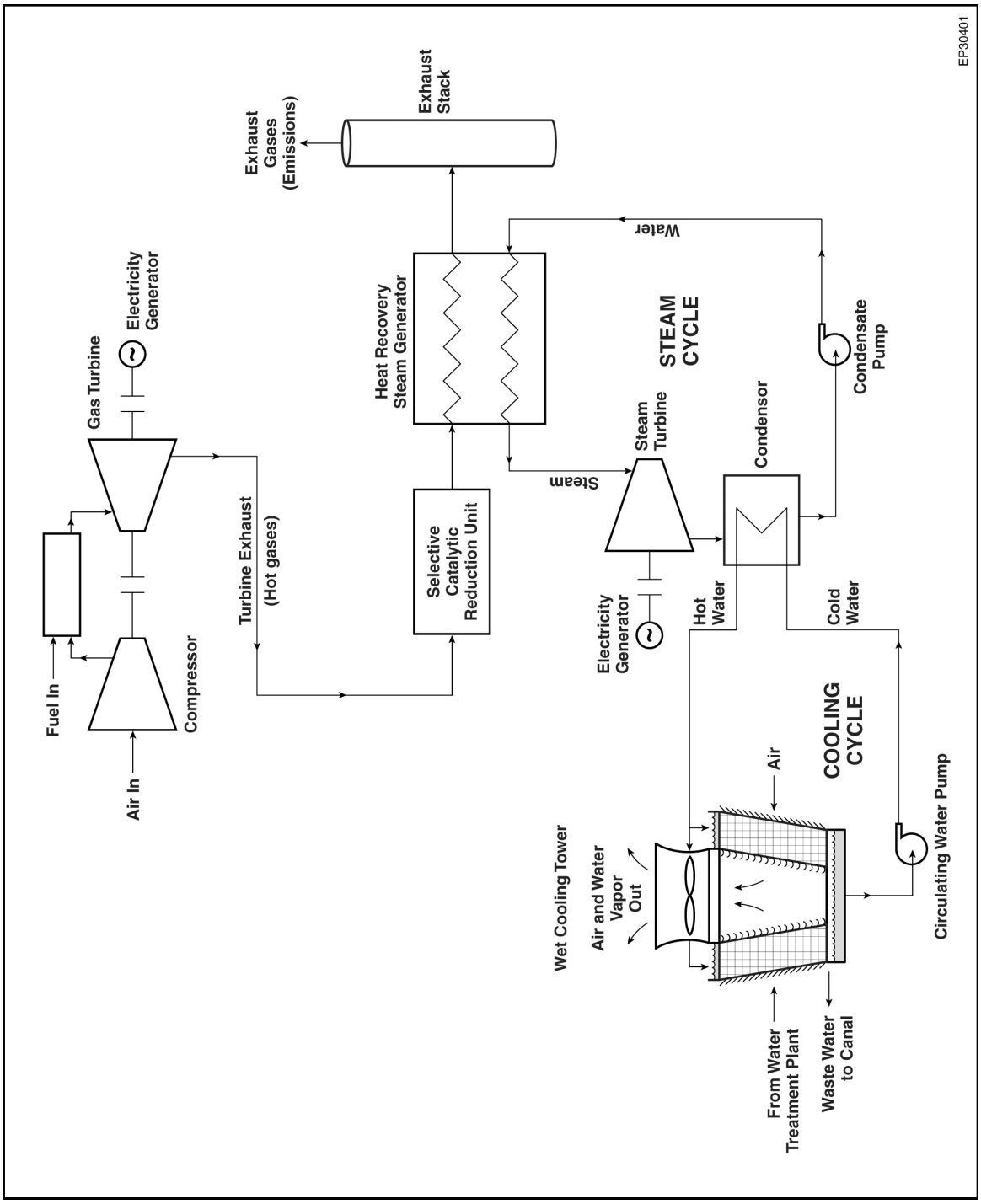



**FIGURE S-6 General Engineering Features at the LRPC and TDM Power Plants**

control $NO_x$ emissions. SCR (Figure S-7) is a postcombustion cleaning technology that chemically reduces $NO_x$ (nitrogen oxide [NO] and nitrogen dioxide [$NO_2$]) into molecular nitrogen and water vapor. A nitrogen-based reagent, such as $NH_3$, is injected either as a gas or liquid into the ductwork, downstream of the combustion turbine. The waste gas from the combustion turbine mixes with the reagent and enters a reactor module containing a catalyst. The hot flue gas and reagent diffuse through the catalyst, and the reagent reacts selectively with the $NO_x$. Unreacted $NH_3$ in the flue gas downstream of the SCR reactor is referred to as $NH_3$ slip. As the catalyst activity decreases, $NO_x$ removal decreases, and $NH_3$ slip increases. When $NH_3$ slip reaches the maximum design or permitted level, new catalyst must be installed. The $NO_x$ removal efficiency of SCR ranges between 85 and 90%.

Both the LRPC and TDM power plants use wet cooling systems. The wet cooling system consists of a surface condenser and a cooling tower. Because water used to produce steam in the steam turbine is demineralized and free of scale-forming material, it is in an open circulating system and reused in the steam turbine. Exhaust steam from the steam turbine is condensed by water circulating in the surface condenser. Demineralized makeup water is introduced into the steam cycle to replenish water lost as heat recovery steam generator blowdown and miscellaneous water and steam losses. Water in the surface condenser is then cooled by air through the cooling tower(s), and the water is recirculated. Water is lost by evaporation in the cooling tower and must be replenished with "makeup water." Cooling towers are characterized by the means by which air is moved. Mechanical-draft cooling towers currently installed at the Sempra and Intergen plants rely on power-driven fans to draw or force the air through the tower. Natural-draft cooling towers use the buoyancy of the exhaust air rising in a tall chimney to

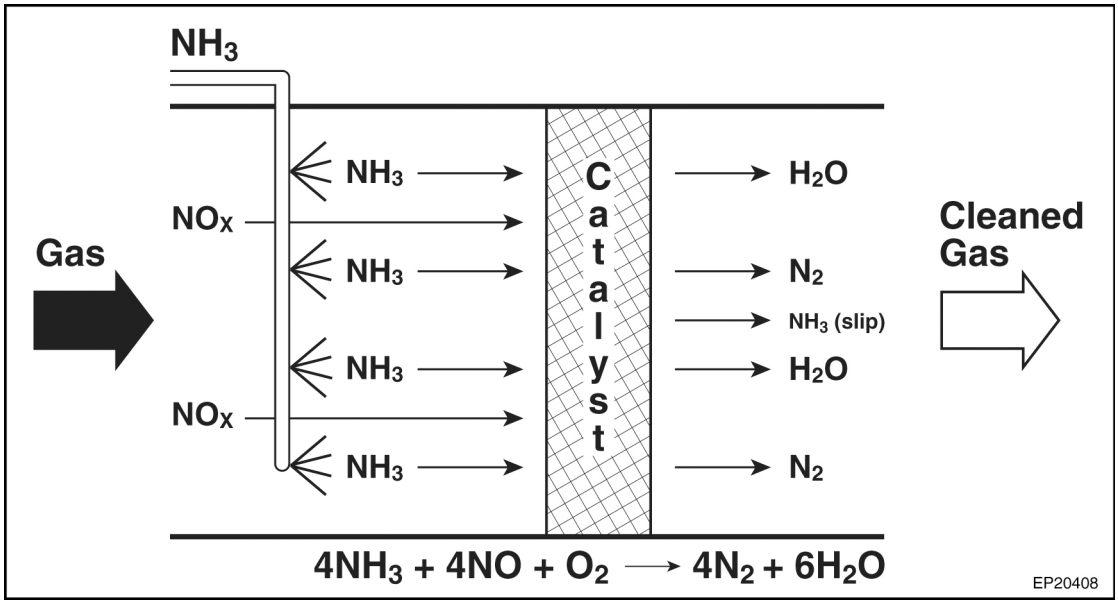



**FIGURE S-7 Schematic of Typical SCR System**

provide the draft. A fan-assisted natural-draft cooling tower employs mechanical draft to augment the buoyancy effect. To reduce the demand for cooling water, the power plants could be retrofitted with either a dry cooling system or a wet-dry cooling system; these are described in Section S.4.3.

Water (both cooling and steam cycle) for both power plants is obtained from the Zaragoza Oxidation Lagoons located west of Mexicali (Figure S-8). The primary source of water entering the lagoons is municipal sewage. Minor sources include storm water runoff and industrial discharge water (both process and sewage). The Zaragoza facility receives and treats approximately 33,200 acre-ft/yr of sewage water (an acre-foot [ac-ft] of water is the volume of water that covers 1 acre [43,560 $ft^2$] to a depth of 1 ft [0.30 m]). The sewage water is processed at the Zaragoza facility through 13 lagoons or settling ponds. It is a primary treatment process in which solids are settled out before the water is discharged into the New River through drainage channels managed by the Comisión Nacional del Agua.

**Water Treatment for LRPC.** The LRPC contracts with the local Mexican municipal water authority, Comisión Estatal de Servicios Públicos de Mexicali, to provide untreated, municipal wastewater. Raw sewage water is obtained at the inlet of the Zaragoza Oxidation Lagoons and piped to a sewage treatment plant adjacent to the lagoons that treats the water for use at the LRPC. Consequently, the water input to the sewage treatment plant has undergone little, if any, settling action from the lagoons. The adjacent sewage treatment plant treats the raw sewage via screening, degritting, degreasing, biological treatment via an extended aeration-activated sludge process (known as Orbal aeration, a process developed by U.S. Filter), nitrification-denitrification, final clarification, and chlorine disinfection. The sludge produced by the treatment plant is dewatered and disposed of as nonhazardous waste. The treated water is pumped and piped approximately 5.2 mi (8.3 km) to the LRPC. Because it is critical to meet the water demands of the LRPC, the sewage treatment plant is expected to operate at flow rates somewhat higher than the demands of the power plants. Excess treated water (up to 1 $ft^3/s$) is discharged to a channel adjacent to the sewage treatment plant. This stream eventually combines with the effluent of the Zaragoza Oxidation Lagoons.

Next to the LRPC, a tertiary treatment plant has been constructed to further treat the water to reduce phosphates, dissolved organic matter, and heavy metals. Part of the water treatment process includes passing through a lime softener and clarifier. This process removes dissolved salts (e.g., calcium, magnesium, and phosphate) from the water obtained from the Zaragoza Oxidation Lagoons. The addition of lime causes the precipitation of calcium and magnesium, thereby removing much of the water's hardness, as well as substantial amounts of alkali metals, heavy metals, and phosphate. This process is the principal mechanism for reducing the quantity of TDS present in the water. The precipitated sludge is flocculated and separated from the water by sedimentation in the clarification process and sent to a press and filter house. Sludge from lime softening is dewatered and disposed of in an off-site landfill as nonhazardous waste.

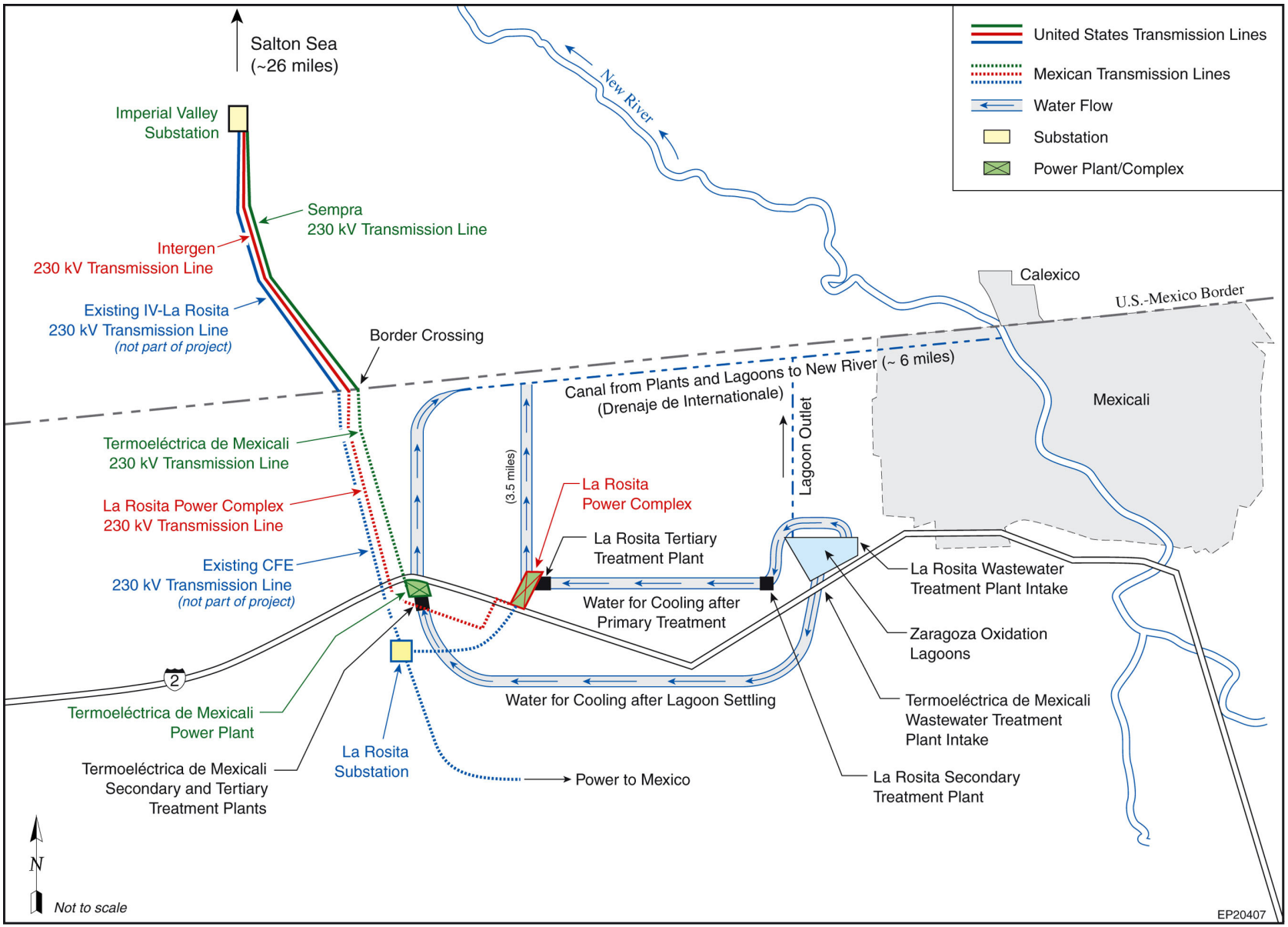



**FIGURE S-8 Water Supply Cycle for LRPC and TDM Power Plants**

Treated and untreated wastewater streams collected from power plant operations are discharged to the drainage channel that eventually connects to the Drenaje de Internationale, a major drainage channel flowing to the east, parallel to the U.S.-Mexico border (Figure S-8). The Drenaje de Internationale empties into the New River within 100 yd (91 m) of the border, about 6 mi (10 km) from the original discharge point. In the LRPC cooling towers, water is used up to five cooling cycles before it is discharged.

**Water Treatment for TDM.** The TDM power plant obtains water from the Zaragoza Oxidation Lagoons after the water is treated in the primary settling ponds. The TDM sewage treatment plant uses a biological treatment process to first oxidize organic matter and $NH_3$ in an aerobic step (in the presence of air following aeration), and then removes nitrates formed by $NH_3$ oxidation by bacterial action under anaerobic conditions (in the absence of air) in a second step, incorporating an activated sludge process with nitrification-denitrification. This treatment process eliminates biological contaminants and reduces other contaminants in the water. After biological treatment, water is clarified by the addition of lime to raise the pH to cause the precipitation of dissolved minerals, such as calcium and magnesium, and to reduce the concentrations of TDS present. The clarified water is then adjusted to neutral pH, with the addition of sulfuric acid, and disinfected through the addition of chlorine. The precipitated sludge settles out, thickens, and finally dehydrates on a belt press to produce a solid, nonhazardous waste, which is hauled to a landfill in Mexico. The water so treated is suitable for use as cooling water, the major use of water at the power plant. It replaces water lost to evaporation from the cooling towers.

Three main waste streams are piped into the waste sump during normal power plant operation. Waste streams mix before being discharged untreated into a drainage channel (the Drenaje de Internationale that eventually leads to the New River [Figure S-8]). The first stream is the wastewater from the cooling tower. The cooling tower bank consists of 12 units, and the water is used for up to six cycles before it is discharged. The second stream is wastewater from the demineralization process. The third stream is water discharged from the steam cycle.

### S.4.3 Alternative Technologies

Under this alternative, DOE and BLM would grant one or both Presidential permits and corresponding ROWs to applicants who would build transmission lines that connect to power plants that would employ alternative cooling technologies and more efficient emissions controls.

#### S.4.3.1 Alternative Technologies Considered But Not Evaluated

**Dry-Only Cooling Technology.** There are two types of dry cooling systems: direct dry cooling and the lesser used indirect dry cooling. In both systems, fans blow air over a radiator system to remove heat from the system via convective heat transfer (rather than using water for cooling or evaporative heat transfer). In the direct dry cooling system, also known as an

air-cooled condenser system, steam from the steam turbine exhausts directly to a manifold radiator system that releases heat to the atmosphere, condensing the steam inside the radiator.

Indirect dry cooling uses a secondary working fluid (in a closed cycle with no fluid loss) to help remove the heat from the steam. The secondary working fluid extracts heat from the surface condenser and flows to a radiator system that is dry cooled (fans blow air through the radiator to remove heat from the working fluid). An indirect dry cooling system is more complex and less efficient than a direct dry cooling system; for this reason, it is also less common. An indirect dry cooling system also produces no environmental advantages over a direct dry cooling system. For these reasons, the dry cooling system discussed in the following paragraphs refers only to a direct dry cooling process.

Dry-only cooling technology is considered here mainly as a means of reducing the amount of water necessary for cooling at the power plants in Mexico (thereby reducing the impacts to the New River and Salton Sea caused by flow reductions under wet cooling). Under this scenario, the LRPC and TDM plants would be retrofitted with a dry cooling system.

A dry-only cooling system is usually used in situations when not enough water is available for wet cooling and the economics of the project can withstand the increased cost and loss of performance caused by its use (the use of dry cooling means less electricity will be produced with the steam produced, and thus more fuel per unit of electricity produced will be consumed). Loss of performance is especially pronounced when the daily mean maximum temperature exceeds 80°F (27°C), to the extent that dry cooling alone is considered impractical at temperatures above this threshold.

The dry-only cooling technology would be an insufficient cooling process for the Mexico power plants for the following reasons:

- In the region, maximum daily temperatures are less than 80°F (27°C) only 37% of the time. Temperatures exceed 80°F (27°C) about 63% of the time, and these high-temperature months tend to coincide with high-electricity-demand months. For plants in this climate condition, wet cooling is necessary for most of the year in order to maintain output and plant efficiency.

- Because the power plants have already been constructed, retrofitting for dry cooling would be extremely costly. For example, Sempra has estimated that it would cost approximately $150 million (43% of the original cost of the plants) to retrofit a dry cooling system. There would also be significant costs associated with shutting down the facilities for the 4 to 5 months needed for retrofit construction.

Dry-only cooling technology is considered infeasible as a retrofit to the existing plants on the basis of its low efficiency in the climate of the power plants and the high cost of redesigning the facilities, replacing equipment, and shutting down the facilities for the duration of retrofit construction. The dry-only cooling technology, therefore, is not evaluated further in this EIS as a reasonable alternative technology for Alternative 3.

**Zero-Liquid Discharge Water Management Technology.** Zero-liquid discharge water management systems are used at steam electricity-generating stations to minimize cooling system wastewater production by reusing as much wastewater as possible within the plant and employing evaporation to eliminate the remaining wastewater. The technology is considered here mainly as a means of reducing discharges of TDS from the power plants in Mexico. Under this scenario, the LRPC and TDM plants would be retrofitted with sidestream softening and reverse osmosis systems to reduce the required amount of cooling tower blowdown (the largest contributor to wastewater). Integrating a reverse osmosis system would also reduce the required capacity of the mechanical evaporator-crystallizer (or spray dryer) that would be needed to evaporate the cooling system wastewater.

The water quality impacts of installing zero-liquid discharge technology are mixed. Calculations show that this technology would decrease TDS and phosphorus concentrations in the New River at the U.S.-Mexico border by about 1%, but it would slightly increase concentrations of total suspended solids (TSS), biochemical oxygen demand (BOD), chemical oxygen demand (COD), and selenium compared with both plants operating without this technology (Appendix K). Flows to the New River would be slightly less than those under the proposed action, since wastewater discharge would be eliminated.

Because the retrofit of a zero-liquid discharge system to the power plants would present several technical challenges and incur significant capital and operating costs but yet yield only minimal water quality benefits, this technology is not evaluated further in this EIS as a reasonable alternative technology for Alternative 3.

### S.4.3.2 Wet-Dry Cooling Retrofit

Because the power plants have been constructed with wet cooling systems, another possible alternative cooling technology is to retrofit the plants with a wet-dry cooling system, which combines both wet and dry cooling technologies (Figure S-9). This section discusses the feasibility of retrofitting the power plants with wet-dry cooling.

The most common dry cooling technology is direct dry cooling, also known as an air-cooled condenser system. In dry cooling, fans blow air over a radiator system to remove heat from the system via convective heat transfer (rather than using water for cooling or evaporative heat transfer). Steam from the steam turbine exhausts directly to a manifold radiator system that releases heat to the atmosphere, thus condensing the steam inside the radiator (see the dry section illustrated in Figure S-9).

A wide range of wet-dry cooling designs is possible, covering the entire spectrum of wet versus dry cooling components depending on plant needs. A typical wet-dry cooling system utilizes both an air-cooled condenser and a wet evaporative cooling tower within the same cooling system. Wet-to-dry cooling ratios would depend on the prevailing ambient air temperatures and humidity. A wet-dry system is sometimes called a “water conservation design” or a “parallel condensing cooling system.” Wet cooling would be used during hot weather, while dry cooling would be used most other times.

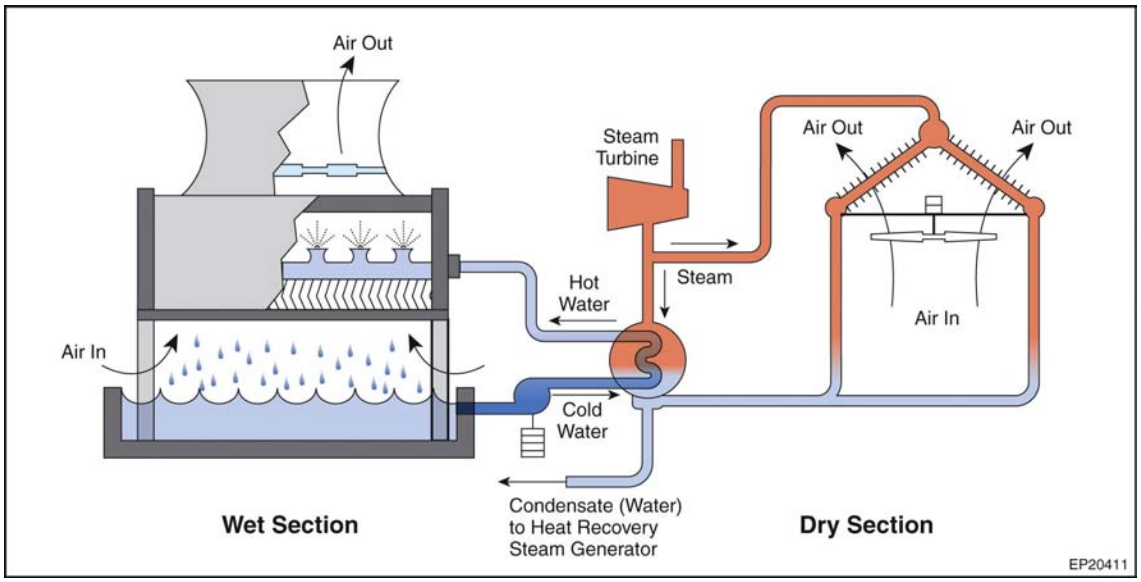



**FIGURE S-9 Wet-Dry Cooling Technology**

Dry cooling has both advantages and disadvantages compared with wet cooling; these would be realized to the degree that dry cooling would be used in a wet-dry cooling application. Advantages of dry cooling may include:

- Significant decrease in water required for dry cooling compared with wet cooling. Typically, dry cooling systems use 90 to 95% less water than power plants with wet cooling systems.

- Minimal use of water treatment chemicals, since air is used in the air-cooled condenser and not water like in the wet cooling tower.

- Minimal generation of liquid and solid wastes, since water impurities requiring disposal are not generated in the air-cooled condenser as they are in a wet evaporative cooling tower.

- No visible water vapor plume, which is present with wet cooling technology during certain meteorological conditions.

- Lower water consumption, that is, 90 to 95% less water would be purchased and treated.

The disadvantages of dry cooling may include:

- Air-cooled condensers can have a negative visual effect because they are often taller than wet cooling towers.

- Decreased efficiency in hot weather compared with wet evaporative cooling.

- Disturbance of a larger land area for the air-cooled condensers than is required for wet cooling towers.

- Greater noise impacts than wet cooling systems because of the greater number of fans and the considerably greater total airflow rate. However, new quieter fans and other mitigation measures are available to reduce these impacts.

- A reduction in power plant steam-cycle efficiency and output, depending on site conditions and seasonal variations in ambient conditions. The efficiency reduction ranges from about 2% when the ambient temperature is 68°F (20°C) to about 8% when the ambient temperature is 104°F (40°C). When factoring in the extra power needed to operate the cooling fans, efficiency could be reduced by a total of 10 to 15%. For a typical combined-cycle power plant where the steam cycle accounts for about one-third of the total capacity, overall plant efficiency would be reduced from 3 to 5%.

- Increased capital and operating and maintenance costs with a dry cooling system.

Application of a wet-dry cooling system allows tailoring the use of either the wet or dry system on the basis of climatic conditions. The issues in deciding whether to retrofit a wet-dry cooling system on both facilities would involve estimating the amount of time the plants would operate in the water-conserving dry cooling mode and the feasibility of adding the necessary equipment, in terms of both equipment cost and the difficulty of integrating the technology into the existing plant.

A potential wet-dry cooling system design would use dry cooling to handle the entire cooling load up to an ambient temperature of 80° to 90°F (27 to 32°C). Wet cooling would augment the dry system at temperatures above 80° to 90°F (27 to 32°C); 100% wet cooling could be used on days the temperature is above 90°F (32°C) to ensure maximum power output from the plants. The analysis of impacts to water resources assumes that dry cooling will be used at temperatures up to 90°F (32°C).

An analysis of data on maximum daily temperatures in Imperial, California, from 1993 to 1999 shows that 37% of the daily maximum temperatures are below 80°F (27°C); 19% are between 80° and 90°F (27° and 32°C); and 44% are more than 90°F (32°C). Therefore, dry cooling only would be expected to be used 37% of the time, while some combination of wet-dry or wet-only cooling would be used 63% of the time.

Retrofitting an existing plant to utilize wet-dry cooling would involve solving a number of possibly complex system integration issues, such as whether there is enough properly situated space to accommodate dry cooling equipment. Dry cooling towers are very large in both height and width; a retrofit at these plants would require an area of as much as 7 acres (3 ha). The cooling towers would also have to be located close to other large structures at the plants, like a turbine hall or heat recovery steam generator, which could negatively affect their performance due to wind effects caused by the interaction between structures; often the larger the tower, the

greater the negative effects. Properly locating equipment is best performed during the plant's planning and design stage, not in a retrofit situation.

Costs associated with the retrofit would also have to be considered. They are estimated at $75 million and would include the capital cost of the new equipment, additional engineering and design costs, greater operation and maintenance costs, and the cost of lost power sales during installation. The outage due to installing the new equipment is estimated to be about 4 to 5 months.

A successful wet-dry cooling retrofit was performed in 1995 on a pulverized coal-fired power plant (Streeter Street Station Unit 7) owned by Cedar Falls Utilities in Cedar Falls, Iowa. However, this plant is very small (generating about 37 MW) and located in a cold climate. Extrapolating this experience for either the TDM or LRPC plants indicates a greater than 10-fold increase. For smaller stations, like Streeter, the size and complexity are less challenging. Such a large extrapolation would be unprecedented, especially in light of the demanding temperatures in Mexico.

#### S.4.3.3 Carbon Monoxide Emissions Control

This alternative includes operation of two power plants equipped with SCR systems to reduce $NO_X$ emissions and using oxidizing catalysts on all gas turbines to reduce CO emissions. The analysis for this alternative assumes that the LRPC power plant would have emissions controls similar to those already described for the TDM plant.

The following is a description of a generic CO control system. CO is emitted when natural gas is not combusted completely. CO emissions in power plants are often controlled with an oxidizing catalyst. A honeycomb-like structure containing the catalyst is placed in the flue gas ductwork. The catalyst is made of precious metals, such as platinum and palladium, which act to promote a chemical reaction to transform CO to carbon dioxide ($CO_2$) (a greenhouse gas produced by human activity). This system can also reduce other hydrocarbons caused by incomplete combustion. These hydrocarbons combine with oxygen to form water and $CO_2$. For effective reduction of CO and hydrocarbons, the flue gas must be lean (i.e., have excess oxygen) to promote the reactions.

### S.4.4 Mitigation Measures

Under this alternative, DOE and BLM would grant one or both Presidential permits and corresponding ROWs to authorize transmission lines whose developers would employ off-site mitigation measures to minimize environmental impacts in the United States. For offsets of air emissions from power plant operations, DOE contacted the Imperial County Air Pollution Control District (ICAPCD) and Border Power to obtain suggestions for off-site mitigation measures that could be evaluated under this alternative. The Imperial Irrigation District (IID) and the Colorado River Basin Regional Water Quality Control Board have developed and published

plans that would offset water reductions and improve water quality within the Salton Sea Watershed.

### S.4.4.1 Water Resources

Mitigation for water resource impacts would focus on potential mitigation measures that could be implemented in the United States to offset increased TDS concentrations in the Salton Sea and/or New River resulting from reduced flow volumes in the New River due to power plant operations. The potential mitigation measures would be designed to offset the annual loss of 10,677 ac-ft (0.41 $m^3/s$) of water under the proposed action (i.e., both plants operating 100% of the time)[2] and could include the following:

- ***Lining canals:*** An estimated 167 mi (269 km) of canal in the Imperial Valley, if available to be lined, would need to be lined to offset the annual loss of water under the proposed action. Concrete liners installed along this length of canal would cost an estimated $18 million; the addition of synthetic liners to reduce water seepage as the system ages would raise the cost to $22 million.

- ***Reducing Evaporative Losses:*** Replacing most of the canal system with pipe could offset the annual water loss under the proposed action by reducing the volume of water lost from the drainage system due to evaporation (about 11,600 ac-ft [0.45 $m^3/s$]). This measure would require replacing the entire approximately 1,667 mi (2,683 km) of canals and laterals in the IID system with pipe.

- ***Fallowing Farmland:*** The area of land needed for fallowing to offset water reductions under the proposed action would depend on the particular crop being fallowed since irrigation needs vary by crop. For a crop like corn, which requires about 2 ac-ft ($7 \times 10^{-5}$ $m^3/s$) of water per year, 5,340 acres (2,161 ha) would need to be fallowed, with the annual cost of fallowing about $7 million.

- ***Groundwater Transfer:*** Groundwater wells could be installed to pump groundwater to the New River or Salton Sea directly. This potential measure would require pumping about 30 wells at a rate of 220 gal/min (830 L/min), possibly at Imperial East Mesa. Studies would be needed to determine whether this pumping rate could be achieved and sustained for the term of the project.

- ***Salton Sea Mitigation Strategies:*** Offsets could possibly be achieved by installing a dike in the Salton Sea to reduce the annual evaporation in the main body of the Sea. Another potential strategy would be to annually remove a

[2] Because the plants would not operate 100% of the time, water reductions and hence mitigation for such reductions are overestimated.

volume of water from the Sea to compensate for losses from the New River. Both strategies could prevent the concentration of salt from increasing at a rate faster than that with no plants operating that would, without this action, occur if the Sea were to achieve a new water surface equilibrium. These measures would require additional feasibility studies and would also have to be coordinated with the Salton Sea Authority's restoration project activities.

A program to mitigate water consumption by the two power plants in Mexico could conceivably consist of one or more of the measures described above. Mitigation opportunities in Mexico may also be possible and could augment the benefits of these actions.

### S.4.4.2 Air Quality

For air quality, the mitigation measures can be evaluated on a per-unit or individual project basis. The evaluation of impacts includes examples of reductions in $PM_{10}$ and $NO_x$ emissions that could occur as a result of updating engines in agricultural and transportation equipment and use of more efficient, newer automobiles. These examples could be assembled into a program that would mitigate impacts from the power plants. The EIS evaluates possible elements of such a program but does not specify combinations of elements.

The following mitigation measures identified by the ICAPCD are also considered under this alternative. None of the measures, individually or collectively, would be able to offset the total quantities of $PM_{10}$ or gaseous emissions produced by the power plants. However, implementation of one or more of these measures would serve to improve air quality in Imperial County.

- ***Paving of Roads:*** The Imperial County Public Works Director provided the ICAPCD with a list of about 50 road segments totaling 23 mi (37 km) that could be paved to reduce fugitive dust emissions. Asphalt paving would cost about $430,000 per mile, assuming a two-lane road.

- ***Retrofitting of Emission Controls on IID Power Plants:*** The ICAPCD suggested that SCR installation on IID steam plant Unit 3 and the peaker plants would reduce $NO_x$ emissions in the area of the projects. However, the IID already plans to repower this unit in 2007–2008 as a combined-cycle gas-fired unit to reduce $NO_x$ emissions.

- ***Enhancing the Use of Compressed Natural Gas in Motorized Vehicles:*** Four projects were identified as follows: (1) provide $150,000 in funding to maintain the El Centro Compressed Natural Gas refueling facility located at Commercial and Fairfield Streets; (2) provide $250,000 in funding for a compressed natural gas fast-fill facility to be constructed at the Calexico Unified School District; (3) acquire land in Brawley, California, for construction of a compressed natural gas facility at a cost of about $250,000 to $500,000; and (4) replace or update engines for the current fleet of ten

40-ft-long (12-m-long) Imperial Valley transit buses and five smaller buses at a cost of about $4 million to $5 million. An overall reduction in particulates of approximately 0.1 ton/yr (0.1 t/yr) would result.

- ***Controlling Imperial County Airport Dust:*** Fugitive dust from natural windstorms and from aircraft (particularly from helicopter landings) occurs frequently at the airport. Estimated funding of $150,000 would be needed to either treat bare desert soils with dust retardants or to purchase crushed rock to cover the soil surface in the most sensitive areas. A reduction in particulates of 15 tons/yr (14 t/yr) could be achieved.

- ***Retrofitting of Diesel Engines for Off-Road Heavy-Duty Vehicles:*** Diesel engines of off-road-vehicle equipment used in agriculture, earthmoving, or construction would be updated to reduce particulate and gaseous emissions. Estimated funding of $250,000 would be needed for this effort. Depending on the retrofit program implemented, overall particulate engine emissions could be reduced by about 3.3 tons/yr (3 t/yr).

Several other mitigation measures could be implemented in the Mexicali region that could serve to improve regional air quality. These include a program to replace older automobiles and buses in the Mexicali region with a newer, less polluting, fleet; reduction of fugitive dust through road paving; and reduction of emissions from brick kilns by converting the fuel used in firing the kilns to natural gas.

## S.5 COMPARISON OF POTENTIAL ENVIRONMENTAL IMPACTS AMONG ALTERNATIVES

The following discussion identifies the environmental implications of choosing among alternatives, organized by resource area. Both temporary impacts during construction and long-term impacts during operation of the projects are considered. This discussion is followed by Table S-3, which provides a summary of impacts for the four alternatives. For the proposed action (i.e., the granting of one or both of the Presidential permits and ROWs), the analysis for most resource areas was bounded by calculating impacts as if both lines had been allowed. This serves two purposes. First, it demonstrates the maximum possible impacts; second, it clearly presents the combined impacts of the agencies' preferred alternative, that is, permitting both facilities. The only exceptions to this methodology are in the areas of air, water, and human health. For these areas, because of the particular concerns expressed by the commentors (and the court), the impacts are presented separately for each facility as well as in combination.

### S.5.1 Geology, Soils, and Seismicity

Under the no action alternative, there would be no potential impacts to geologic resources. Current geologic conditions would continue, and no prime farmland soils would be disturbed. Erosional processes would continue naturally in undisturbed areas. Potential seismic

hazards associated with active fault systems in the area of the projects would not be a relevant concern.

Under the proposed action, placement of the transmission lines, access roads and spurs, and temporary staging areas would require some disturbance, removal, and compaction of surface and near surface material. Because of the relatively flat topography of the area of the projects, however, the potential for slope failure would be low. Soils along the proposed and alternative transmission line routes would be affected at the support structure sites, access road and spur areas, construction areas, and staging areas. No cultivated land would be disturbed. It is likely that the lower portion of the western alternative routes could cross prime farmland soils.

Temporary and permanent impacts would occur during the construction phase in the immediate area of construction-related activities. Impacts would include an increased potential for soil erosion because of vegetation removal to prepare the site, soil disturbance associated with grading to construct access roads and spurs, and excavation associated with installing the tower support structures. Other areas of soil disturbance would include the work areas around each tower, pull sites, lay-down areas, and the trench for optical cables. Soil compaction would occur as a result of vehicles on the access roads and spurs and heavy equipment within the lay-down areas used for monopoles. (The steel lattice towers and A-frame support structures would be delivered by helicopter.)

Although the Imperial Valley is seismically active, neither the proposed routes nor the alternative routes lie within an Alquist-Priolo fault-rupture hazard zone. On the basis of the California Geological Survey's ongoing evaluation of fault zones to date, surface fault rupture is not likely to occur along any of the proposed or alternative transmission line routes.

The use of more efficient air emission control technologies and alternative cooling technologies would not change the transmission line configurations as described under the proposed action; thus, the impacts to geologic and soil resources under the alternative technologies alternative would be the same as those for the proposed action.

Under the mitigation measures alternative, any paving of roads would lead to some temporary, short-term impacts to soils along road ROWs (e.g., soil compaction or minor erosion from surface disturbance caused by equipment and vehicles parked along areas being paved). The overall impact of road paving would be beneficial because it would reduce fugitive dust emissions and soil erosion. Similar impacts could occur at the construction sites of the compressed natural gas fast-fill stations (i.e., in Brawley or adjacent to the Calexico Unified School District). Implementation of dust controls, such as chemical dust retardants and crushed rock on areas prone to wind erosion at the Imperial County Airport, would be beneficial.

## S.5.2 Water Resources

### S.5.2.1 Water Use

Under the no action alternative, only the LRPC EAX unit would be able to operate and would consume 4,940 ac-ft/yr (0.l9 $m^3/s$) of water for cooling taken from the Zaragoza Oxidation Lagoons in Mexicali that would otherwise flow to the New River and on to the Salton Sea. The proposed action, mitigation measures, and alternative technologies alternatives would include EAX operation plus operation of the EBC export unit at the LRPC plant and the TDM plant. The proposed action and mitigation measures alternatives would consume 10,667 ac-ft/yr (0.42 $m^3/s$) of water (the LRPC plant alone would consume 7,170 ac-ft/yr [0.28 $m^3/s$]; the TDM plant alone would consume 3,497 ac-ft/yr [0.14 $m^3/s$]). Under the alternative technologies alternative, the use of wet-dry cooling would consume about 56% less water than under the proposed action. Water treatment and consumption by the power plants would affect the quality and quantity of water in the New River and in the Salton Sea.

### S.5.2.2 New River

Power plant operations under the proposed action alternative would reduce the average annual flow of the New River at the Calexico gage (near the U.S.-Mexico border) by about 5.9%. Since the New River gains in flow from agricultural runoff as it flows northward, decreases in the average annual flow at the Westmorland gage near the Salton Sea would be much less, about 2.3%. The combined annual water consumption for the power plants would represent about 23.3% and 34.7% of the natural variability in annual flow at the Calexico and Westmorland gages, respectively. These decreases in flow would result in a decrease in average annual water depth of about 0.13 ft (3.9 cm) at the Calexico gage and 0.07 ft (2.1 cm) at the Westmorland gage. These changes would maintain floodplains within the extent of historical values; therefore, impacts to New River floodplains would be minimal. Impacts on flow under an alternative cooling technology scenario (wet-dry cooling) would be less than the impacts on flow under the proposed action since wet cooling would be used only 44% of the time. Impacts on flow under the no action alternative would also be less, about 46% of those under the proposed action alternative.

Power plant operations would also affect the water quality of the New River. TDS concentrations (i.e., salinity) would increase due to the evaporation of water for cooling and return of TDS to the New River. However, the annual total TDS load to the river would be reduced somewhat due to the permanent removal of some TDS by the water treatment plants associated with the power plants.

Under the proposed action alternative, TDS concentrations at the Calexico gage near the U.S. border would increase 5.6%, or about 46% of TDS variability in the New River, and would remain less than the 4,000-mg/L water quality objective for the Colorado River Basin. Average TDS for the New River at its outlet to the Salton Sea would increase by about 2.1% for both plants operating (a smaller percent than at the Calexico gage, because flow and TDS

concentrations in the New River tend to increase in the downstream direction from existing inputs along the river). The change in the temperature of the New River under the proposed action is estimated to be only about 0.5°F (0.3°C) because of the mixing of power plant discharge water with a much larger volume of water in the New River.

Under an alternative cooling technology scenario, TDS concentration increases would be less, depending on the extent to which dry versus wet cooling was used. The TDS concentration increase under the no action alternative would be less than 3.7% at the Calexico gage. The loads (total mass) of TSS, BOD, COD, selenium, and phosphorus, as well as of TDS, would also be reduced by plant operations.

Mitigation strategies adopted by the IID that focus on water conservation could offset water flow reductions in the New River and improve water quality within the Salton Sea Watershed.

Mitigation measures for reducing air impacts, such as paving 22 mi (35 km) of dirt roads and construction of fast-fill compressed natural gas stations, could result in impacts related to soil erosion, thus increasing, at least temporarily, the sediment loads to nearby water bodies. Over the long term, paving roads and other surfaces subject to frequent physical disturbance would reduce erosion (and thus potentially reduce sediment discharge to streams). When it rains in the desert, little water penetrates (almost all of it runs off), so the effect of paving on surface runoff is negligible.

### S.5.2.3 Floodplains: Pinto Wash and New River

**Pinto Wash.** Construction of footings for the support structures along the proposed transmission lines could affect the 100-year floodplain for the Pinto Wash. Since the excavations for the footings would be backfilled and the original ground contours would be restored, the impacts associated with these activities are expected to be minimal and temporary. Cylindrical sections of the footings would protrude above the ground surface; on the basis of plans for the proposed lines, a maximum of two lattice tower footings for each transmission line would be in the 100-year floodplain. The placement of these footings would result in a minimal permanent change to conditions in the floodplain, with minimal impacts on natural and beneficial floodplain values.

**New River.** Along the New River, changes in water flow and depth produced by power plant operations would lie well within the variability of the flows for the New River. While plant operations could result in a small theoretical reduction in maximum flood elevation, this change would have no practical effect on the incidence or extent of floods or floodplain function.

### S.5.2.4 Salton Sea

Reductions in New River flow would result in a decrease in inflow to the Salton Sea, thus reducing its volume, lowering its elevation, and decreasing its surface area. Under the proposed action and mitigation measures alternatives, the decrease in water volume in the Sea would be about 10,667 ac-ft ($1.32 \times 10^7$ $m^3$), less than 0.1% of the Sea's volume. The corresponding change in elevation would be about −0.05 ft (−0.6 cm), about 10% of the Sea's natural variability. Surface area would be decreased by about 97 acres (39 ha). This represents a decrease of about 0.04% of the Sea's initial surface area. Under the no action alternative, the reduction in the surface area of the Salton Sea would be only about 40 acres (16 ha).

Impacts to water quality in the Salton Sea would result from consumption of water from power plant operations. With no plants operating, the TDS concentration (salinity) in the Sea is about 44,000 mg/L. Assuming that the inflow of TDS (salt) to the Salton Sea is about 9,200 million lb/yr (4,172 kg/yr), the natural rate of increase in TDS concentration is about 443.6 mg/L/yr. After 1 year, this increase would yield a TDS concentration of about 44,444 mg/L.

With both plants operating, the TDS concentration resulting from the reduction in inflow volume to the Salton Sea would be about 44,063 mg/L (an increase of about 0.14% compared with no plants operating). Under this scenario, the natural rate of increase in TDS concentration, that is, with no plants operating, would be about 443.8 mg/L/yr. After 1 year of power plant operations, this increase would yield a TDS concentration of about 44,507 mg/L. This TDS value is expected to be conservative (i.e., higher than the actual value) because not all salts entering the Sea add to its TDS; some precipitate.

After 1 year, the Salton Sea would adjust its elevation to the reduced inflow caused by the annual operation of the power plants and establish a new equilibrium (i.e, the rate of evaporation would be equal to the rate of water inflow from all sources). Thereafter, there would be almost no difference between the no action and the three action alternatives in their effect on TDS concentrations. The TDS value predicted for both plants operating for 1 year (44,507 mg/L) is much less than the 60,000-mg/L value considered by the DOI's Bureau of Reclamation and others as a value that would be detrimental to fishery resources. Without the power plants operating, the Salton Sea would reach a salinity of 60,000 mg/L in approximately 36.07 years. With both plants operating, a salinity of 60,000 mg/L would be reached in 36.06 years, or 4 days sooner than without the plants operating.

Operations of the water treatment plants associated with the power plants would reduce the load of phosphorus that the New River discharges to the Sea by about 150,000 lb (68,030 kg), which is about a 5.8% reduction in the total phosphorus load to the Salton Sea (the New River delivers about 50% of the phosphorus load to the Sea). Selenium loads would be reduced by about 38 lb/yr (17 kg/yr), which represents only a very small fraction of the total selenium load to the Sea.

Under the mitigation measures alternative, conservation measures such as lining canals, reducing evaporative losses, and fallowing farmland would yield water savings; however, it is

not reasonable to assume that the IID would be interested in undertaking such a project at this time given the extensive water conservation measures it is currently undertaking for the Quantification Settlement Agreement and the significant financial, legal, environmental, and policy issues involved. Given these considerations, along with the limitations of the groundwater transfer (due to the declining status of groundwater in the area and its potentially high TDS concentrations) and the administrative complexities associated with removing water from the Salton Sea or building a dike within it, it is possible that none of the mitigation measures described can be readily implemented. In addition, impacts from other projects that are not being mitigated (e.g., the Mexicali II Wastewater Treatment Plant) and the reductions in Colorado River flow into Mexico, resulting in less water ultimately flowing back into the United States via the New and Alamo Rivers, would overwhelm the beneficial impacts of any mitigation efforts associated with this proposed project.

#### S.5.2.5 Brawley Wetland

At the Brawley wetland site, water is withdrawn from the New River at a rate of about 7 ac-ft/yr ($2.74 \times 10^{-4}$ $m^3/s$). No flow measurements have been made at the Brawley wetland site; however, one can conservatively assume that the flow at this location is the same as at the upstream Calexico gage (flow increases in the New River in the downstream direction). For average conditions, the water demand for the Brawley site is about 0.004% of the flow at the Calexico gage.

The low, average, and high annual flows for the New River at the Calexico gage are about 118,000, 180,000, and 264,000 ac-ft/yr (4.62, 7.04, and 10.33 $m^3/s$), respectively. Even under conditions of the lowest annual flow, the combined consumptive use of water by the power plants would be less than 10% of the flow in the New River. These flow reductions due to plant operation should not prevent the withdrawal of the water required for the Brawley wetland by the existing pump.

Even with reduced annual loads to the New River, operation of the two power plants would increase the TDS in the river at the Calexico gage by less than about 6% and increase the selenium concentration by about 6%. These increases would occur because of a reduced volume of water flowing in the river. Decreased concentrations would occur for TSS, BOD, COD, and phosphorus (–2.3%, –5.8%, –17.0%, and –7.5%, respectively). Increases in TDS and selenium concentrations should not exceed the tolerance of wetland plants, whereas the changes in other water quality parameters could be beneficial. In all cases, the changes would be within the range of the parameters' variability.

#### S.5.2.6 Groundwater

Construction of footings for the support structures along the proposed transmission lines could be deep enough to enter the groundwater zone. Potential impacts to groundwater from transmission line construction would be limited to temporary and localized lowering of the water table if it was necessary to dewater an excavation to install a footing.

Indirect impacts to groundwater would occur as a result of decreasing flow in the New River, since the New River is a recharge source for groundwater in the Imperial Valley Groundwater Basin. However, since the New River is only one of many recharge sources, contributing about 7,000 ac-ft/yr (0.25 $m^3/s$), and the reduction of flow is expected to be low, the impacts to groundwater resources resulting from all alternatives are expected to be minimal.

### S.5.3 Air Quality

Air quality impacts resulting from transmission line construction include those from fugitive dust emissions, $PM_{10}$ emissions, and fuel combustion emissions. Fugitive dust would be generated by construction vehicles used for excavation, by helicopter movement and landings for delivery of support structures, and by entrainment of soil on vehicle wheels. Impacts due to fugitive dust emissions are expected to be small and localized and would end once the construction activities are completed. Dust generation could be controlled by spraying water on access roads and work areas and tower sites.

Fugitive dust emissions would not affect ambient $PM_{10}$ levels in the area of the projects. Fugitive $PM_{10}$ emissions associated with tower pad construction are estimated to be about 26.4 lb (11.9 kg) of $PM_{10}$ per acre per day over the construction period. Vehicular traffic to and from the construction areas and helicopter operations would generate a total of about 5.4 tons and 0.67 ton (4.9 t and 0.61 t) of $PM_{10}$, respectively, over the construction period. Construction-related $PM_{10}$ emissions over the construction period would be about 11.4 tons (10.3 t) for the proposed routes, 14.4 tons (13.1 t) for the western alternative routes, and 12.3 tons (11.2 t) for the eastern alternative routes. Periodic maintenance activities would generate a maximum of 0.08 ton/yr (0.07 t/yr) (and slightly more for the longer alternative routes). Fuel combustion emissions associated with construction vehicle traffic are expected to be minimal and temporary in nature.

Air quality impacts from power plant operations would result from emissions of $NO_x$, CO, $CO_2$, and $PM_{10}$ from the combustion of natural gas (stack emissions); $PM_{10}$ from cooling towers; and $NH_3$ (known as $NH_3$ slip) from the SCR system used to reduce $NO_x$ emissions.

Total volatile organic compound (VOC) emissions during the transmission line construction phase of the proposed route would be a maximum of about 0.361 ton (0.327 t); total $NO_x$ emissions would be about 1.86 tons (1.69 t). VOC and $NO_x$ emission estimates for the alternative routes are virtually the same. VOC and $NO_x$ emissions during transmission line operation and maintenance are expected to be negligible.

Under the no action alternative, the three gas turbines of the LRPC EAX unit would operate, but the EBC unit at the LRPC and the TDM plant would not operate. Total emissions of CO and total $PM_{10}$ emitted would be 2,181 tons/yr and 714 tons/yr (1,979 t/yr and 648 t/yr), respectively. Total $NO_2$ and $NH_3$ slip emitted through March 2005 would be 2,005 tons/yr and 74 tons/yr (1,819 t/yr and 67 t/yr), respectively. After the SCRs are installed on the two LRPC EAX Mexico turbines, $NO_2$ emissions would be reduced to 285 tons/yr (258 t/yr), while $NH_3$ slip would increase to 222 tons/yr (201 t/yr).

Under the proposed action, the EBC unit plus EAX export turbine at the LRPC and the TDM plant would operate. Emissions of CO and total $PM_{10}$ caused only by these units would be 1,635 tons/yr and 732 tons/yr (1,483 t/yr and 664 t/yr), respectively. The $NO_2$ and $NH_3$ slip emitted by these units would be 418 tons/yr and 498 tons/yr (379 t/yr and 452 t/yr), respectively.

Projected increases in concentrations of $NO_2$, CO, and $PM_{10}$ under both the no action and proposed action alternatives all fall below the EPA SL for each pollutant (a benchmark used in this EIS of the threshold of significant impacts to air quality).

The potential for $O_3$ formation related to plant emissions is also evaluated. $O_3$ is a secondary air pollutant formed in the presence of sunlight from a variety of precursors that include $NO_x$, VOC, and CO. Analysis in this EIS indicates that operation of power plants under all alternatives would result in minimal (< 1 ppm) increases in $O_3$ levels compared to background levels as a result of $NO_x$ and VOC emissions under typical meteorological conditions.

Under the proposed action alternative (the EBC unit and the EAX export turbine at the LRPC and the TDM plant operating), $CO_2$ emissions would be about 5,100,000 tons/yr (4,600,000 t/yr), a value that is 0.088% of the total U.S. emissions from fossil fuel combustion. Under the no action alternative, $CO_2$ emissions would be about 3,900,000 tons/yr (3,500,000 t/yr) or about 0.066% of total U.S. emissions. There are currently no Federal guidelines on $CO_2$ emissions in the United States.

Estimated exposures in the United States to $NH_3$ and hazardous air pollutants (HAPs) emitted from the plants and associated health risk estimates are discussed in Section S.5.11.2.

Indirect air quality impacts in the United States from operation of power plants in Mexico relate to consumption of cooling water and projected exposure of the Salton Sea lakebed, resulting in additional $PM_{10}$ emissions from wind erosion. Under the proposed action, reductions in annual inflow to the Salton Sea from the New River would expose an estimated 97 acres (39 ha) of shoreline that is currently under water. Emission rate estimates for $PM_{10}$, based on a comparison with the emissions from Owens Lake, a dried lakebed in Inyo County, California, would be less than 10 tons/yr (9 t/yr).

Under the alternative technologies alternative, the TDM plant would use SCR and oxidizing catalysts to reduce CO emissions. The LRPC would also incorporate SCR systems on all turbines by March 2005; however, it would not use CO emission controls. The increase in ambient CO concentrations in Imperial County associated with emissions from export turbines equipped with CO oxidizers would be slightly lower than under the proposed action. All values, including those under the proposed actions, are well below SLs established by the EPA. An alternative cooling technology (wet-dry cooling) would be used at power plants that connect to the transmission lines. The dry cooling phase of a wet-dry system tends to reduce plant efficiency on the order of 10 to 15%, especially when outdoor temperatures exceed 90°F (32°C). This would reduce electrical output for a given fuel input and would necessitate additional fuel consumption, thus increasing most plant emissions. Total $PM_{10}$ emissions, by stack and wet cooling towers (that operate for wet cooling systems only) would be reduced.

Measures to improve air quality under the mitigation measures alternative generally focus on ways to compensate for air quality impacts in the United States due to power plant operations. Measures identified by the ICAPCD include paving roads, retrofitting emissions controls on IID power plants, enhancing the use of compressed natural gas to fuel motorized vehicles, controlling Imperial County Airport dust, and retrofitting diesel engines for off-road heavy-duty vehicles. $PM_{10}$ and $NO_x$ emissions could be reduced by paving roads, retrofitting emissions controls on IID power plants, and retrofitting diesel engines. Mitigation opportunities in Mexico could also prove to be beneficial and cost effective; these could focus on vehicle inspection and a vehicle retirement program for older vehicles.

## S.5.4 Biological Resources

### S.5.4.1 Transmission Corridors

Under the no action alternative, there would be no impacts to biological resources to desert habitat or wildlife since no transmission lines would be built.

Impacts to biological resources as a result of transmission line construction under the action alternatives would include temporary and permanent disturbance to desert habitat between the U.S.-Mexico border and the IV Substation. Under the proposed action, permanent impacts would involve about 3.1 acres (1.3 ha) of Sonoran creosote bush scrub and 0.3 acre (0.1 ha) of desert wash habitat adjacent to the existing transmission line routes from construction of tower bases and new access roads. Temporary impacts to these resources would also occur, involving approximately 15 acres (6.0 ha) of Sonoran creosote bush scrub and 0.5 acre (0.2 ha) of desert wash. Construction along the alternative routes would affect larger areas of desert habitat because both alternative routes would be longer than the proposed routes and new access roads would have to be constructed. Regardless of which transmission line is selected, there is a potential for construction activities to introduce noxious or invasive plant species to existing desert habitats.

General impacts to wildlife in the area of the projects may occur because of increased human activity and noise during construction activities.

After construction is completed, a relatively low acreage of habitat dispersed over the proposed routes would be lost as vegetated wildlife habitat because of the placement of foundations for transmission line towers and because of soil disturbance in spur road areas. However, even new roads may have some residual habitat value (e.g., as basking areas for reptiles).

Bird species, such as neotropical migrants that are protected by the Migratory Bird Treaty Act, would not be adversely impacted by construction of the proposed transmission lines. Raptors that occur along the proposed and alternative transmission line routes could use the towers as perching sites. There would be no impact to raptors from electrocution when landing on the towers because the spacing between the conductors and ground wire on the top of the

towers exceeds the wing span of the bald eagle (the largest raptor that likely could occur in the area of the projects).

Construction of the transmission lines would not impact any plants or animals Federally listed as threatened or endangered, but could potentially destroy some plant species considered sensitive by the California Native Plant Society. These impacts could occur as a direct result of construction activities or as an indirect impact if invasive plants were accidentally introduced.

No wetlands would be affected by the proposed projects within the transmission line routes, but a total of 0.21 acre (0.08 ha) of desert wash areas would be affected. This impact would result from placement of tower footings and access roads in the desert wash areas (the largest wash area is Pinto Wash). The area of desert wash habitat within the eastern and western alternative transmission line routes has not been formally surveyed or quantified, but would likely be similar to that within the proposed transmission line routes.

The area in which the transmission lines would be constructed is located in the Yuha Basin ACEC and in the Yuha Desert Management Area for the flat-tailed horned lizard, a species of special interest to BLM. The applicants have agreed to mitigation measures to minimize impacts to the flat-tailed horned lizard, the western burrowing owl, and other species that BLM considers sensitive biological resources.

The flat-tailed horned lizard is active during most of the year, but is dormant and hibernates between approximately November 15 and February 15. The animal hibernates in burrows, usually within a couple of inches of the ground surface. The applicants would attempt to schedule construction to occur as much as possible during the flat-tailed horned lizard's dormant period (November 15 to February 15) and employ all mitigation measures recommended by the management strategy during that period. Construction would be completed in as short a period of time as possible to minimize the length of time that the habitat would be disturbed. However, some construction would probably be necessary during the flat-tailed horned lizard's active period (before November 15 and after February 15). If so, the applicants would employ additional mitigation measures during that period. In addition, the applicants would employ mitigation measures intended to minimize the general disturbance of biological resources and to ensure the restoration of disturbed areas.

Several features of the project, as proposed by the applicants and described in Section 2.2.1.4, would be effective in minimizing harm to biological resources. These include positioning the lattice towers and locating access roads so that permanent disturbance can be minimized. In addition, moving the tower assemblies to their locations in the line by helicopter, rather than assembling them on site, would greatly reduce the amount of disturbance at each tower location. The mitigation recommended in this EIS includes monitoring for flat-tailed horned lizards and western burrowing owls and would help to limit impacts to other sensitive biological resources.

### S.5.4.2 New River

Under the no action alternative, only the EAX unit at the LRPC would operate. Impacts to biological resources in the New River due to changes in water quality and volume under the no action alternative would be smaller than impacts from the proposed action.

The slight change in average water depth of 0.6 in (1.5 cm) at the Westmorland gage on the New River under the no action alternative would not adversely affect riparian vegetation or aquatic organisms. There would be either no effect or a very small negative effect on riparian vegetation from a slight change in the groundwater level in the immediate vicinity of the New River from operation of the EAX unit.

The decrease in COD and phosphorus concentrations projected at the Calexico gage would result in DO concentrations that would improve the survival of fish and invertebrates in the New River. Also, small changes in salinity, COD, phosphorus, and DO are not likely to change the extent of riparian vegetation or the species that utilize this habitat.

Operation of the LRPC alone would reduce the quantity of selenium loading in the New River by less than 0.16% of that reported for the Calexico gage. By the time water would have traveled more than 20 river miles to the Brawley wetland, selenium loads and concentrations would be lower, assuming no reduction occurs in the flow rate of the New River. Immobilization of selenium occurs in sediments, particularly in slow-moving and standing waters such as the wetlands. No data were available for selenium concentrations in sediments or water at the Brawley wetland; therefore, there was no evaluation of impacts to wetland vegetation. Since the total load of selenium to the New River would be reduced by operation of the power plants, and flow rate reductions from power plant water use would not likely reduce water depth in the stretch of the river that supplies water to the Brawley wetland, adverse impacts to vegetation or the species that utilize this habitat are not expected.

Indirect impacts to riparian communities associated with the New River could result from power plant operations, since the power plants would reduce the flow and depth of water in the New River and increase the concentrations of water quality parameters like salinity (measured as TDS). Decreases in water level, however, are not likely to result in impacts to riparian plant species since these changes would be on the scale of a few centimeters, and much of the dominant existing vegetation in the riparian zone is relatively drought-tolerant. Increases in New River TDS (from 2,620 mg/L under the no action alternative to 2,766 mg/L under the proposed action alternative) would remain below the 4,000-mg/L water quality objective for the Colorado River Basin and would have little or no effect on the growth of riparian vegetation (which generally also has a high tolerance for salinity).

Decreases in New River water depth would not affect the operation and maintenance of the Brawley wetland since the water intake for the pump used to supply water to the wetland is located deep enough to work under the slightly reduced flows. The predicted values for TDS and selenium concentrations should not exceed the tolerance of the wetland plants present and should have no effect on the viability of the wetland. The California bulrush is reportedly capable of tolerating salinities up to about 6,000 mg/L, and salinity tolerances for other freshwater wetland

plants have been estimated at about 4,800 mg/L. Under the proposed action, average salinity at the Calexico gage at the U.S.-Mexico border would be about 2,766 mg/L, with less than a 0.01% chance that this concentration would exceed 4,000 mg/L.

Because implementation of the proposed action would have a very small to no effect on the riparian or wetland habitats along the New River, similarly there would be a very small to no effect on wildlife communities.

The anticipated water quality changes in the New River are expected to have relatively minor impacts to fish and aquatic invertebrate populations between the Calexico gage and the Salton Sea. Slight increases in average salinity concentrations would fall within the range of levels that have occurred historically and would not likely adversely affect the survival or distribution of fish and aquatic invertebrate species.

Phosphorus, which is largely responsible for causing algal blooms that can result in periods of low DO in the river, would be slightly reduced under the proposed action. However, the estimated levels for phosphorus concentrations and BOD at the Calexico gage are only slightly smaller (0.05 mg/L and 0.6 mg/L less, respectively) than levels that would occur under the no action alternative (LRPC operation only), and potential beneficial changes in distributions of fish and invertebrates as a result are also likely to be small. Overall, it is anticipated that the net effects of slightly reduced flows, slightly increased salinity, and slightly reduced nutrient inputs would have a slight impact on the aquatic organisms in the New River.

The alternative technologies alternative using a wet-dry cooling system could impact biological resources in the New River. Potential impacts to the New River would be reduced if a wet-dry cooling system was employed. The use of wet-dry cooling technology would reduce water consumption compared with that identified for the proposed action alternative. While use of a wet-dry cooling system would result in less potential for adverse impacts compared with the proposed action, it should be noted that impacts to biological resources associated with the New River resulting from implementation of either the proposed action or the alternative technologies would be small.

Implementation of actions under the mitigation measures alternative would be the same as impacts under the proposed action since all plants would be assumed to be operating. Actions such as paving of roads in Imperial County or construction of compressed natural gas service stations in El Centro or Calexico would not affect water quality in the New River and thus not impact biological resources.

### S.5.4.3 Salton Sea

Under the no action alternative, the increase in salinity levels in the Salton Sea would occur at essentially the same rate as with no plants operating. The aquatic invertebrates and fish inhabiting the region of the Salton Sea receiving inflow from the New River should not be

adversely impacted by low DO events from eutrophication[3] because phosphorus loading would be reduced by EAX unit operations.

Indirect impacts to biological resources in the Salton Sea would occur as a result of changes in flow volume, salinity, and nutrient levels of the New River under the proposed action alternative. Reduction in New River flow volumes would reduce the inflow to the Sea, slightly increasing its salinity. Under the proposed action and mitigation measures alternative, it is estimated that the salinity in the Salton Sea would reach a critical level (60,000 mg/L) in about 36.06 years, approximately the same as the estimated time under no action (i.e., 36.0 years). Salinity above a concentration of 60,000 mg/L would exceed tolerances for survival of most aquatic species in the Sea. Biological resources would be impacted by increasing salinity before this critical level would be reached.

In the nearer term (about 1 year), the proposed action would result in an annual phosphorus load to the Salton Sea of about 3.7% less than if no plants were operating. This decrease would likely reduce eutrophication in the area of inflow and could reduce the frequency (relative to the situation if no plants were operating) at which low DO events occur. (These events could cause mortality in fish and aquatic invertebrates in that part of the Sea.) Depending on the salinity levels (i.e., if they remain below the critical level of 60,000 mg/L), the reduction in phosphorus could increase the availability of food resources for birds and other wildlife that use the Salton Sea.

Impacts to habitat for waterfowl and wading birds that are summer residents or that migrate through the area are not expected to occur, since the maximum reduction in water elevation of the Salton Sea (as a result of decreases in inflow volume) under the proposed action would be small (about 0.05 ft or 0.6 cm).

The alternative technologies alternative using a wet-dry cooling system could impact biological resources in the Salton Sea. Potential indirect impacts to the Salton Sea would be reduced if a wet-dry cooling system was employed. The use of wet-dry cooling technology would reduce water consumption compared with that identified for the proposed action alternative. While use of a wet-dry cooling system would result in less potential for adverse impacts compared with the proposed action, it should be noted that impacts to biological resources associated with the New River resulting from implementation of either the proposed action or the alternative technologies would be small.

Implementation of actions under the mitigation measures alternative would be the same as impacts under the proposed action since all plants would be assumed to be operating. Measures that would offset reductions in flow volume in the New River could slightly improve water quality in the New River and Salton Sea and thus could have a small positive impact on

[3] Eutrophication is the process by which freshwater bodies are enriched by nutrients, such as phosphorus and nitrogen, which leads to excessive plant growth. This plant growth usually occurs as an extensive growth of algae, which eventually die and cause reduced oxygen levels because of their bacterial breakdown. The lower water oxygen levels can lead to fish kills.

biological resources. Actions such as paving of roads in Imperial County or construction of compressed natural gas service stations in El Centro or Calexico would not affect water quality in the New River and thus not impact biological resources.

### S.5.4.4 Special Status Species

Special status species include Federal- and State-listed threatened and endangered species and those species considered sensitive by BLM. Impacts to special status species occurring in the riparian or aquatic habitats of the New River or the Salton Sea under the no action and action alternatives would not be expected since many of these species do not occur within the areas potentially affected by the proposed projects. Small changes in New River flow volumes and water quality are not expected to result in adverse impacts to the southwestern willow flycatcher, Gila woodpecker, or bank swallow that occur in the desert scrub riparian areas. Small changes in Salton Sea water elevation are expected to be too small to create adverse impacts for special status bird species (e.g., bald eagle, brown pelican, and Yuma clapper rail). Decreases in nutrient levels, however, may produce small beneficial impacts by reducing episodic fish kills from reduced oxygen levels, thus resulting in an improved food base for fish-eating birds. Because the desert pupfish is highly tolerant of elevated salinity, it is not likely to be affected by increases in salinity under either the no action or action alternatives.

There is a high potential for adverse impacts to the flat-tailed horned lizard and the western burrowing owl and their habitats as a result of transmission line construction activities. These impacts would be reduced by implementing protective measures as directed by BLM.

While there is a potential for bald eagles to occur within the vicinity of the proposed transmission line routes, it is relatively unlikely because suitable foraging areas (i.e., open bodies of water containing fish) are not located nearby. The bald eagle is highly mobile and would likely move out of the way during construction, thereby reducing the potential for immediate impacts from construction activities. Because the spacing between the transmission lines would be considerably greater than the wingspan of a bald eagle, electrocution would be highly unlikely if the lines are constructed, although there is a potential for isolated deaths through collision with the conductors. However, the transmission line previously constructed within the utility corridor has been in place for approximately 20 years, and no bald eagle deaths due to the presence of the line have been reported during that time.

Under the alternative technologies alternative, implementation of the wet-dry cooling technology on power plants would reduce water consumption compared with the proposed wet cooling system. The impacts to the New River and Salton Sea from a wet-dry cooling system would change water levels and water quality only slightly in comparison with the no action and proposed action alternatives. Therefore, no impacts are expected to the desert pupfish, bald eagle, brown pelican, Yuma clapper rail, southwestern willow flycatcher, Gila woodpecker, or bank swallow from implementation of the alternative technologies alternative. Impacts to terrestrial species along the transmission lines (flat-tailed horned lizard and the western burrowing owl) would be the same as those identified for the proposed action.

The impacts of implementing the mitigation measures alternative on protected species would depend on the nature and location of the actual measures employed. Measures that would offset reductions in flow volume in the New River would improve the overall water quality in the New River and ultimately the Salton Sea, and thus have a positive impact on biological resources.

For measures to offset air quality impacts, if the paving of roads was selected as the mitigation measure to be employed, a review for proximity to Federal, State-protected, or sensitive species would be necessary to ensure that they are not impacted during paving. If protected species were likely to be impacted, the U.S. Fish and Wildlife Service (USFWS) and California Game and Fish Department would be contacted before the start of paving or construction activities.

Site-specific information on the protected species at the location planned for the mitigation action would need to be obtained prior to implementing the measure in order to determine the appropriate way of minimizing or avoiding impacts. Impacts to special status species would be similar to or greater than those identified for the proposed action.

### S.5.5 Cultural Resources

Under the no action alternative, the Presidential permits and corresponding ROWs would be denied, and the transmission lines would not be built. Therefore, no impacts to cultural resources would be expected.

Under the proposed action, three alternative transmission line routes were evaluated. A cultural resources survey was conducted for the proposed routes to ascertain if any cultural resources are present. The survey discovered 9 previously recorded sites and recorded 18 new sites and 34 isolated artifacts. All but one of the sites appear to be from the prehistoric period and are likely related to Lake Cahuilla, an ancient lake located along the applicants' proposed routes. The historic period site dates to the 1930s. Twenty-three of these sites have been recommended as eligible for *National Register of Historic Places* (NRHP) listing. Of the sites identified, four would be directly impacted under the proposed action using the applicants' proposed routes. There is also the potential for additional impacts from the creation of access roads and lay-down areas. A treatment plan for the four potentially eligible sites was developed and approved by the California State Historic Preservation Office (SHPO) to mitigate the adverse effects that would result from construction of the transmission lines.

BLM has partially surveyed the western alternative routes for the presence of cultural resources. The western routes were chosen to avoid cultural resources. This would be partially achieved by being west of the Lake Cahuilla shoreline. As a result, the potential for impacts to archeological resources would be less along the western alternative routes than along the proposed routes. However, the transmission lines in the western routes would run along the U.S.-Mexico border for a greater distance, and the border itself is considered a cultural resource. These routes would have the potential to degrade the appearance of the border by introducing a visual intrusion. If these routes were selected, additional cultural resource surveys would be

necessary as well as additional consultation with the SHPO and the appropriate Native American Tribes.

The eastern alternative routes have been partially surveyed for cultural resources. Use of the western or eastern alternative routes is expected to have a lower potential to impact cultural resources, since they are not located along the Lake Cahvilla shoreline. If these routes were selected, a cultural resources survey would be necessary as well as additional consultation with the SHPO and the appropriate Native American Tribes.

Use of more efficient control technologies (use of oxidation catalysts to reduce CO emissions) and alternative cooling technologies would not change the transmission line configurations; thus the impacts to cultural resources under the alternative technologies alternative would be the same as those for the three alternative routes under the proposed action.

In addition to activities described for the proposed action, activities under the mitigation measures alternative would require consultation with the SHPO before construction (e.g., paving of roads) commences. If cultural resources were to be impacted, the NRHP eligibility status of the sites would have to be evaluated. If found to be NRHP-eligible, protective measures for these sites would be developed in consultation with the SHPO and the appropriate Native American Tribes.

### S.5.6 Land Use

Under the no action alternative, the Presidential permits and corresponding ROWs would be denied, and the transmission lines would not be built. Land use in the Yuha Basin ACEC would remain limited.

The environmental impacts to land use associated with granting the Presidential permits and corresponding ROWs would be similar for all of the proposed routes. Land use would be restricted along the access roads for the new transmission lines regardless of which routes were chosen. Additional impacts would be incurred for the proposed western and eastern alternative routes because each would require a new restricted access road to be built across the desert. The proposed routes would use the existing limited access roads. The total amount of permanent disturbance for the western and eastern alternative routes (13.1 and 10.4 acres [5.3 and 4.2 ha], respectively) would be higher than for the proposed routes (<3.6 acres [<1.4 ha]). The western alternative routes would run partially outside of BLM-designated Utility Corridor N and would require a plan amendment. Under the proposed and eastern alternative routes, no alteration of current land use plans would be necessary. Locating the transmission lines east or west of the existing line would create new areas with further restricted land use. However, since the entire area encompassing the applicants' proposed routes and the eastern and western alternative routes is designated as a limited use area and given the small amount of land needed for the transmission lines, this additional limiting of land use would not represent a major impact.

Two locations in the southern portion of the proposed routes were previously used for the mining of sand and gravel. Mining activities have been discontinued in these areas. The nearest

active mines are 2.5 mi (4 km) west of the proposed routes and would be unaffected by locating the transmission lines for the proposed or alternative routes.

Recreation activities in the Yuha Basin ACEC are somewhat limited. Travel is allowed on BLM-designated routes only. Routes designated "Limited Use" south of Interstate 8 are restricted to street legal vehicles only. All vehicles are allowed on routes designated "Open." Parking is permitted adjacent to routes south of Interstate 8 only during daylight hours, except unoccupied vehicles next to the Jacumba Wilderness left by overnight wilderness visitors. Camping is permitted only in designated areas within the Yuha ACEC. There are no designated camping areas within 10 mi (16 km) east or west of the proposed transmission line routes.

No agricultural activities take place on BLM-managed land. Therefore, using the proposed routes on BLM land is not expected to interfere with any agricultural practices. If the eastern alternative routes were chosen, however, there is some potential for interference with crop-dusting activities. The lower portion of the western alternative routes could cross prime farmland soils.

The use of the western or eastern alternative routes would require that portions of the transmission lines run parallel to the border. The U.S. Customs and Border Patrol Agency discourages practices of this sort because it would require additional patrolling to ensure the integrity of the lines.

Use of more efficient control technologies and alternative cooling technologies would not change the transmission line configurations as described under the proposed action; thus land use impacts under the alternative technologies alternative would be the same as those for the proposed action.

The expected impacts to land use under the mitigation measures alternative would depend on the nature of the mitigation measures. For example, if the paving of roads was selected as a mitigation measure, increased access to certain remote areas that are currently difficult to access could result in adverse impacts to current land use.

### S.5.7 Transportation

Under the no action alternative, the Presidential permits and corresponding ROWs would be denied, and the transmission lines would not be built. With no construction traffic, there would be no increases in local traffic, and local conditions would continue.

Small increases in local traffic would be expected throughout the duration of transmission line construction for the proposed and alternative routes. Workers residing locally, including those residing in the area temporarily, would travel to the construction sites by private vehicles. In addition, for the proposed routes, 10 workers would be brought to the construction sites from Mexico by bus on a daily basis. Most workers would travel between the El Centro and Calexico areas and the construction site on State Route 98. For the proposed routes, construction traffic would vary across the 5 months of construction, from 18 round-trips per day in the first

2 months, falling to 8 in the third month and 5 in the last 2 months. Given the current levels of service on State Route 98 and the relatively low traffic volumes associated with the proposed action, no impact on existing levels of service over local segments of State Route 98 are expected for any of the routes.

Use of more efficient control technologies and alternative cooling technologies would not change the traffic volumes associated with transmission line construction as described under the proposed action; thus transportation impacts under the alternative technologies alternative would be the same as those for the proposed action.

Impacts to local transportation networks under the mitigation measures alternative would depend on the nature of the mitigation measure. In the short term, any mitigation-related construction project would increase local traffic.

### S.5.8 Visual Resources

Under the no action alternative, the Presidential permits and corresponding ROWs would be denied, and the transmission lines would not be built. No changes in landscape contrast would occur, and the area in the vicinity of the proposed lines would maintain a Class III Visual Resource Management (VRM) rating.

The area in the vicinity of each facility is classified as a Class III Visual Resource Inventory Area. VRM Class III objectives stipulate that the existing character of the landscape should be partially retained and that any level of change should be moderate. While landscape changes may attract attention, they should not dominate the view of casual observers.

The addition of transmission lines to the eastern alternative routes would be a prominent addition to the existing landscape for road users. While additional lines along the proposed routes would be a visible feature of the landscape, the lines would be constructed by using steel lattice towers similar to those of the existing line, where the natural light and background landscape elements that show through the structures would diminish the impact of the additional line on the landscape. Given the type of construction used for the towers, the visual impression of the towers would also lessen considerably with distance from the line. Similarly, the view from the nearest residence, located 1.3 mi (2.1 km) east of the existing line would not be impacted substantially, given the location of the existing line and the landforms and vegetation between this location and the proposed routes.

Transmission lines built along the alternative eastern and western routes would have impacts similar to those along the proposed routes. Although the lines of the western alternative routes would diverge from those of the existing line, the majority of the divergence would occur south of State Route 98 in a relatively remote part of the county with no readily accessible or inhabited locations. The majority of the alternative western routes north of State Route 98 and the entire stretch of the eastern alternative routes would be within 0.5 mi (0.8 km) of the existing line. Because of the routes' proximity to the existing line, views to road users from key observation points on either side of the transmission routes are not likely to differ substantially

between the alternative routes. However, the location of the eastern alternative routes would be closer to the nearest residence and would therefore be a larger aspect of the landscape than lines constructed along either of the other routes.

Construction and operation of the transmission lines would meet the visual contrast criteria established under the objectives for VRM Class III, whereby the existing character of the landscape would be partially retained, with any level of change being moderate. The project would attract attention to viewers in the area, but it would not dominate views. A number of measures might be used to mitigate the visual impacts of the lines on people traveling along State Route 98, including the reduction of the use of shiny metal surfaces on transmission towers or the treatment of these surfaces to allow blending with prominent desert background colors.

Use of more efficient control technologies and alternative cooling technologies would not change the transmission line configurations as described under the proposed action; thus impacts to visual resources under the alternative technologies alternative would be the same as those under the proposed action.

The impacts to visual resources under the mitigation measures alternative would depend on the nature of the mitigation measures. For example, the ICAPCD indicated that a compressed natural gas fast-fill station would be similar in appearance and size to a gasoline service station. Thus, the heights of structures would not cause a visual contrast that would attract the attention of viewers.

### S.5.9 Noise

Under the no action alternative, the Presidential permits and the corresponding ROWs would be denied, and the transmission lines would not be built. Noise levels would continue at background levels of about 35 A-weighted decibels [dB(A)].

During construction of the proposed transmission lines, daytime noise would increase in areas located near the ROWs. Typical noise levels for construction would be about 90 dB(A) at a distance of 50 ft (15 m) from the operating equipment, assuming two pieces of equipment are operating simultaneously.

Noise levels decrease about 6 dB as the distance from the source doubles because of the way sound spreads geometrically over an increasing distance. The nearest residence to the proposed routes is located 6,900 ft (2,100 m) directly to the east along State Route 98. At this location, noise from construction activities would be 48.6 dB(A). This level would be about 43.8 dB(A) as day-night average sound level (DNL), if construction activities are assumed to be limited to an 8-hour daytime shift. This value is below the EPA guideline level of 55 dB(A) for residential zones, which was established to prevent interference with activity, annoyance, or hearing impairment. The western alternative routes would be even farther from any residence, and again, the noise impacts during construction would be below the EPA guidance level.

If the eastern alternative routes were used, the distance to the nearest existing residence would be decreased to about 360 ft (109 m) from the center of the ROW along State Route 98. At this distance, where construction activity would occur at any one time, the estimated noise level would be 74.3 dB(A) and 69.5 dB(A) as DNL for an 8-hour daytime shift. This value is much higher than the EPA guideline of 55 dB(A) as DNL. However, this construction activity near the residence would be limited to a short duration (less than 1 week) and then move to the next tower. These estimates are probably an upper bound because they do not account for other types of attenuation, such as air absorption and ground effects due to terrain. Since this impact is associated with the construction phase only, it would be temporary and short term.

Operation of transmission lines can result in noise impacts from corona, which is the electrical breakdown of air into charged particles, caused by the electrical field at the surface of conductors. Corona-generated audible noise from transmission lines is generally characterized as a crackling or hissing noise. Modern transmission lines are designed, constructed, and maintained so that during dry conditions, they will operate below the corona inception voltage; that is, the line will generate a minimum of corona-related noise. During dry weather conditions, noise from the proposed transmission lines would generally be indistinguishable from background noise (35 dB(A) DNL or less) at locations beyond the edge of the ROW. During very infrequent rainfall events, the noise level at the edge of the ROW would be less than 39 dB(A). This is a low level (typical of the noise level in a library). Because of the arid climate in the region and the distance of receptors from the ROW, the impact of corona-generated audible noise during operation of the proposed and alternative transmission line routes is expected to be negligible.

Occasional maintenance activities on the transmission lines and substation would be required. Noise impacts from these activities would be intermittent.

Use of more efficient air emission control technologies and alternative cooling technologies would not change the noise levels associated with transmission line construction or operation as described under the proposed action; thus noise impacts under this alternative would be the same as those under the proposed action.

The noise impacts under the mitigation measures alternative would depend on the nature of the mitigation measure. For example, one mitigation measure could be paving roads. This would cause short-term noise impacts from operation of the road paving equipment, especially if the road paving occurred near residential areas. Another mitigation measure, retiring older automobiles, could have beneficial noise impacts (reduction of noise).

### S.5.10 Socioeconomics

Under the no action alternative, the Presidential permits and corresponding ROWs would be denied, and the transmission lines would not be built. Local economic activity would continue at current levels.

Although a small number of workers are expected to temporarily relocate to Imperial County during construction of the proposed transmission lines, these workers would reside in the county for a maximum of only 5 months, and it is unlikely that the relocated workers would be accompanied by their families. Impacts of the project on the population would therefore be minimal. No impacts to local housing markets are expected, as it is assumed that in-migrating workers would occupy temporary accommodations, with no impact on the local rental housing market. With only a small number of temporary in-migrants, impacts on local public services, including police and fire protection, educational and other local government services, and health and medical resources would also be minimal.

No new jobs would be created in Imperial County to operate the transmission lines; consequently, no permanent in-migration or population impacts are expected.

Construction of the transmission lines along the proposed or alternative routes would create a small amount of direct and indirect economic activity in the county. Construction along the proposed routes would create 69 direct jobs. There would be no increase in direct employment for the alternative routes. However, since the alternative routes are longer than the proposed routes, slightly more time would be required for construction, with additional labor and material expenditures required to complete lines along these routes. Wage and salary expenditures and material procurement associated with direct expenditures for each alternative route would produce indirect employment impacts ranging from 23 for the proposed routes, to 25 for the eastern alternative routes, and 32 for the western alternative routes. The total employment impact would be 92 for the proposed routes, 94 for the eastern alternative routes, and 101 for the western alternative routes. None of the routes would impact the county employment growth rate for 2002 by more than 1/100th of a percentage point.

Longer construction durations for the alternative routes are reflected in both the direct and indirect labor income impacts. Construction along the proposed routes would produce $1.4 million in direct income and an additional $0.5 million in indirect income, with $1.9 million in income produced in total. Slightly more total labor income would be produced by the eastern and western alternative routes ($2 million and $2.6 million, respectively) than with the proposed routes.

No new jobs would be created in Imperial County to operate the transmission lines; consequently, no additional employment or income would be generated from line operations.

Impacts of the projects on local government revenues would be slight, with small differences between the proposed routes and the two alternative routes. Sales taxes generated directly by project expenditures and indirectly through the overall increase in economic activity resulting from wage and salary expenditures and material procurement would amount to roughly $25,900 for the proposed routes, $27,300 for the eastern alternative routes, and $34,900 for the western alternative routes.

A small number of employees would stay in temporary accommodations for the duration of the project, producing tax revenues through the motel occupancy tax. These revenues would

range from $6,900 for the proposed routes, $7,300 for the eastern alternative routes, and $9,300 for the western alternative routes.

In addition to tax revenues generated by the projects for local and State governments, the projects would also generate lease rental revenue for the Federal government through payments made to BLM. These would range from $2,180 for the proposed routes, $2,300 for the eastern alternative routes, and $1,934 for the western alternative routes.

Use of more efficient air emission control technologies and alternative cooling technologies would not produce changes in employment, housing, or government revenues associated with transmission line construction as described under the proposed action; thus socioeconomic impacts for this alternative would be the same as those under the proposed action.

Socioeconomic impacts under the mitigation measures alternative would depend on the nature of the mitigation measures. However, in general, alternative measures are likely to create local employment as a result of hiring and material procurement. Mitigation-related wage and salary spending and material expenditures would have a beneficial effect on the overall level of economic activity in the county.

## S.5.11 Human Health

### S.5.11.1 No Action

Under the no action alternative, both Presidential permits and corresponding ROWs would be denied and the transmission lines would not be built. The electric and magnetic field strengths in the area of the projects would equal those associated only with the existing SDG&E line.

Also under this alternative, only a portion of the EAX unit at the LRPC plant would operate (the TDM plant and the EBC unit at the LRPC plant would not operate). The resulting air concentration increases from primary and secondary pollutants would be below SLs established by the EPA. Human health impacts from these emissions of would be minimal.

As discussed in Appendix H, the health risk assessment (HRA) provides a range of potential risks by using average and high-end exposure assumptions. The potential cancer risks due to operation of three turbines at the LRPC were estimated to range from 0.41 per million to 1.50 per million. The potential impacts to chronic and acute hazard indices were modeled to be 0.002 and 0.02, respectively. The chronic and acute risks from the no action alternative are well below the SL of 1.0.

### S.5.11.2 Proposed Action

**Electric and Magnetic Fields.** Data for 230-kV transmission lines similar to the proposed Intergen and Sempra lines suggest that magnetic field strengths at the centerline range from 34 to 48 mG; at 60 ft (18 m) from the centerline (corresponding to the edge of the ROW), they range from 5 to 8 mG; at 100 ft (30 m) from the centerline, they range from 1.3 to 2.3 mG; and at 200 ft (61 m) from the centerline, they range from 0.19 to 0.35 mG. Because the three 230-kV lines (one existing and two proposed) would run parallel to each other, with each line's ROW adjacent to the neighboring line's ROW, the magnetic fields in their vicinity could be somewhat greater than the fields reported in the literature for individual lines. It is also possible that some cancellation of magnetic fields would occur under this alignment of the three lines. For this assessment, the maximum magnetic field strengths for split-phase transmission lines cited above were assumed, and it was assumed that the fields would be additive.

For the applicants' proposed routes, the highest field strength would be found directly beneath the center transmission lines (Intergen lines) at a level of approximately 53 mG (48 mG from that transmission line, plus about 2.3 mG from each of the transmission lines located 120 ft [37 m] to either side of the center transmission line). At the edge of the ROW for either the existing line or the new Sempra transmission line, the approximate magnetic field strength would be 11 mG (8 mG from the nearest transmission line 60 ft [18 m] away, plus about 2.3 mG from the transmission line 120 ft [37 m] away, and less than 0.4 mG from the transmission line 300 ft [91 m] away). At 140 ft (43 m) from the edge of the ROW on either side of the transmission lines, the field strength would be less than 0.35 mG, in the range of the background magnetic field strength of less than 1 mG.

Field strengths would be slightly lower if either of the alternative transmission routes was selected; however, the width of the area with a field strength greater than 10 mG would be decreased from 360 ft (110 m) (the width of the ROWs of the three lines combined) to 240 ft (73 m) (the width of the lines combined).

In the United States, the proposed transmission line routes would be more than 1,500 ft (470 m) from the BLM land boundary to the east at all locations. The eastern alternative routes would be more than 300 ft (91 m) from the BLM land boundary. No residences can be built on BLM property. Since magnetic fields would be at background at locations more than 140 ft (43 m) from the edge of the ROWs, no exposures above background would occur at residential locations for the proposed routes or either of the two alternative routes. No adverse health impacts would be associated with residential magnetic field exposures from the transmission lines.

Transmission line workers would have higher-than-background magnetic field exposures while working within the transmission line ROWs. Work activities would generally be limited to monthly inspections of towers and poles and other intermittent repair work. Most studies of electrical workers have not shown an association between the worker's elevated exposure levels and cancer risk. Recreational visitors passing within the transmission line ROWs would also have higher-than-background magnetic field exposures for limited amounts of time. Exposure

data suggest that these temporary elevated exposures would not result in 24-hour average exposures much greater than background levels and would not result in adverse health impacts.

**Criteria Air Pollutants.** Power plant emissions would result in increases in ambient concentrations of $NO_x$, $PM_{10}$, and CO in Imperial County. All such increases would be below SLs established by the EPA and used as a benchmark of air quality impacts. Accordingly, health impacts from plant emissions would not exceed a threshold level of concern for these pollutants.

Possible secondary formation of $O_3$ in the atmosphere would not contribute to an increase in $O_3$ concentrations in Imperial County of more than 1 part per billion (ppb), which is less than 1% of the National Ambient Air Quality Standard (NAAQS) of 120 ppb (1 hour). Health impacts from secondary $O_3$ formation would therefore be minimal.

The proportion of areawide $PM_{10}$ attributable to direct emissions from the power plants would be low in comparison with the total ambient concentrations in Imperial County, as measured at the area air quality monitoring stations. Secondary particulate matter (PM) from power plant emissions would only be a very small fraction of that from other emission sources in the region and would not exceed SLs in combination with direct PM emissions from the plants.

The high incidence of asthma in Imperial County is a particular concern. In the years 1995–1997, Imperial County had the highest age-adjusted asthma hospitalization rate for 0- to 14-year olds of all California counties (556 hospitalizations per 100,000 person years). The rate for the entire Imperial County population was also high (207 hospitalizations per 100,000 person years). $O_3$ and PM in the region may be contributing factors. However, the operation of the TDM plant and the EBC and EAX export units at the LRPC plant would contribute only minor increases to the $O_3$ and PM levels in the region and thus would result in, at most, a small increase in the asthma problem (less than one additional hospitalization per year) or other air-quality related health problems. The estimated maximum increase in asthma hospitalizations in Imperial County is two to three cases per year out of a base of 323 cases per year. This result, however, is an overestimate because it uses the maximum $PM_{10}$ increment in Imperial County from power plant emissions determined in the air dispersion modeling in Section 4.3.4.4.2 of the EIS as an exposure concentration. This value of 2.45 $\mu g/m^3$ taken from Table 4.3-4 represents a maximum increase for a 24-hour average for any location in the county over a representative 5-year period of meteorological conditions. Because the increase in the annual average concentration of $PM_{10}$ in the county, which should be used in estimates of health impacts, is estimated to be 0.11 $\mu g/m^3$ (Table 4.3-4), the actual number of additional asthma cases is expected to be less than one per year.

**Hazardous Air Pollutants and Ammonia.** The HRA results of potential cancer risks due to HAP emissions from operation of four turbines at the LRPC and two turbines at TDM ranged from 0.60 per million to 2.22 per million, representing the average and high-end exposure assumptions.

The incremental increase in cancer risk from exposure to HAPs ($NH_3$ is not a carcinogen) ranges from 0.20 per million to 0.72 per million for the average and high-end exposure assumptions, respectively. The average and high-end point estimate risks are below the significance threshold of 1 per million. The incremental increase in the chronic hazard index for exposure to HAPs plus $NH_3$ is 0.001, and the incremental increase in the acute hazard index is 0.01, both of which are below the significance threshold of 1.0 for hazard indices.

The same risk calculation methodology used for the alternatives analysis was used to calculate the individual risks associated with operation of the LRPC and TDM power plants. The estimated cancer risk for TDM operating alone (two gas turbines) ranges from 0.06 per million to 0.22 per million. The cancer risk for LRPC operating alone (four gas turbines) ranges from 0.54 per million to 2.00 per million. The TDM risk is much lower due to the fact that there are only two turbines present at the TDM plant, compared with four at the LRPC. In addition, the TDM turbines are controlled with oxidation catalysts, while the LRPC turbines do not have HAP controls.

### S.5.11.3 Alternative Technologies

Use of alternative technologies at the power plants in Mexico would not produce changes in the electric and magnetic field (EMF) strengths associated with the proposed transmission lines as described under the proposed action, thus human health impacts would be the same as those described for the proposed action.

The use of CO oxidizers on the TDM and/or LRPC turbines could decrease CO emissions by a factor of about 7 (see Tables 4.3-4 and 4.3-6). However, the estimated CO levels at the maximum modeled receptor points would be less than 2% of the significance level even without the CO oxidizers. At such low levels, the addition of CO oxidizers would not appreciably alter the potential for human health impacts.

In terms of air emissions, the dry cooling phase of a wet-dry cooling system would not generate PM emissions from cooling tower drift. Because the direct PM emissions from the power plants would not have an adverse impact using wet cooling technology as currently designed, that is, they are below SLs, the decrease in PM emissions from the use of a dry cooling phase would result in a minor reduction of adverse impacts. However, because the dry cooling component of a wet-dry cooling system reduces power plant efficiency, power plant emissions would increase accordingly. Associated health impacts would be minimal.

### S.5.11.4 Mitigation Measures

The impacts to human health under the mitigation measures alternative cannot be determined because design information for the individual mitigation projects has not been developed. Actions such as replacing older automobiles with a newer, less polluting fleet; paving roads; providing natural gas to fuel brick kilns in Mexicali; converting the engines of off-road diesel-powered equipment used in agriculture; increasing the use of compressed natural gas in

Imperial Valley transit buses; and installing SCR technology on the IID's Unit 3 at the steam plant — all would result in reductions of pollutant emissions in the project region.

Air mitigation measures that would measurably reduce the level of PM in the study area (e.g., retiring older automobiles, paving roads) could result in a small reduction in the number of asthma cases and other respiratory problems in the region.

Water mitigation measures, if they can be implemented, would not be expected to produce any human health impacts.

### S.5.12 Minority and Low-Income Populations

Under the no action alternative, the Presidential permits and corresponding ROWs would be denied, and the transmission lines would not be built. As a result, there would be no related impacts to minority and low-income populations in Imperial County.

Temporary impacts from noise and dust emissions during transmission line construction and more long-term impacts from noise and EMF strengths near the transmission lines during their operation were analyzed at the block group level within a 2-mi (3-km) corridor along the proposed and alternative routes. A comparison with the spatial distribution of minority and low-income populations in Imperial County shows that the temporary impacts from noise and dust emissions and the more long-term impacts from noise and EMF in the vicinity of the transmission lines would not contribute to high and adverse impacts to the general population or to disproportionately high and adverse impacts to minority and low-income populations in any block group.

Impacts to minority and low-income populations due to power plant emissions were also assessed at the block group level. Block group centroids were matched with the closest air monitoring receptor station to provide data on the local nature of emissions due to power plant operations. For each of the receptor stations, increases in air pollution due to emissions of $PM_{2.5}$ and $PM_{10}$ were found to be below new source SLs used as a benchmark for negligible impacts. Therefore, these emissions would not contribute to high and adverse impacts to the general population or to disproportionately high and adverse impacts to minority and low-income populations in any block group.

The reduction in New River inflow to the Salton Sea would increase the Sea's salinity and nutrient concentration. Current estimates indicate that even without contributions from the proposed action, salinity levels in the Salton Sea could reach critical levels detrimental to fishery resources in about 36 years. Adverse impacts to fishery resources from power plant operations under the proposed action would not result in high and adverse impacts to the general population who fish recreationally at the Sea; thus, these impacts would not be disproportionately high and adverse for any populations who might rely on the Sea for subsistence fishing. The time frame during which impacts would occur to fish species would be about 36 years, essentially the same with or without the power plants operating.

Use of more efficient control technologies and alternative cooling technologies at the power plants in Mexico would not change transmission line construction or operations; therefore, impacts to minority and low-income populations would be the same as those described under the proposed actions. The use of emissions control technologies would have beneficial impacts to air quality and thus also would generally have beneficial impacts to minority and low-income populations. The use of a wet-dry cooling system could potentially reduce adverse impacts to the Salton Sea due to the proposed action; however, impacts under either alternative would be minor.

The mitigation measures to compensate for power plant air emissions would likely have a beneficial impact on regional air quality. This would also be the case for measures taken to offset flow volume reductions in the New River. An assessment of impacts at the census-block level was not conducted for this EIS because of uncertainty as to where the mitigation measures would be implemented.

## S.6 CUMULATIVE IMPACTS

Cumulative impacts that could occur as a result of the potential impacts of the proposed action when added to impacts from other past, present, and reasonably foreseeable future actions are evaluated both for the period of project construction and for the postconstruction (operation) period for as long as the impacts would last. The region of influence varies for each resource area and depends primarily on the distance a potential impact can reach.

The following actions are ongoing or have been evaluated as reasonably foreseeable and included in the analysis of cumulative impacts: IID water conservation and transfer project, Mexicali II wastewater treatment project, Salton Sea restoration project, Total Maximum Daily Load (TMDL) program, wetlands construction on the New River, and power plant development in the Imperial Valley-Mexicali region. Several general trends (e.g., precipitation, demographics, water use, and energy demand) for the Imperial Valley-Mexicali region were also identified that could contribute to cumulative impacts.

The most important cumulative impacts would be to water resources, air quality, and biological resources. Impacts to soils, noise, transportation, and socioeconomics due to the proposed action during the short term (for the construction period) would be localized and not likely to contribute to cumulative impacts.

The potential cumulative impacts to water resources relate mainly to the reduction in the volume of flow in the New River from the proposed action, which would, in turn, reduce inflow in the Salton Sea. Combined with ongoing and foreseeable projects, most notably the IID water conservation and transfer project, these reductions in New River flow would decrease the elevation of water in the Salton Sea and increase its salinity. The volume of water available to recharge groundwater in the Imperial Valley Groundwater Basin would also be reduced. Although other foreseeable projects like the TMDL program and construction of wetlands on the New River would have beneficial effects on water quality in the Salton Sea watershed, it is not clear whether the cumulative effects of all actions in the watershed on biological resources would be beneficial or adverse. Salinity concentrations in the Salton Sea are increasing and could reach

a point such that adverse impacts to fish and aquatic species, and the birds that feed on them, would be unavoidable. Likewise, salinity increases in New River water could increase to a point that would adversely affect riparian and wetland plant species and fish and aquatic invertebrates in the river after a period of about 36 years. The proposed action would contribute to these changes, but it would have a relatively small contribution.

The cumulative effects of past, present, and future actions, including industrial and agricultural trends (increased acreage and use of irrigated lands) in the Imperial Valley-Mexicali region, would be to increase emissions of pollutants like $NO_x$, CO, $PM_{10}$, and $NH_3$ to the Salton Sea Air Basin. The proposed action would contribute to these ongoing changes, but it would have a relatively small contribution. In addition, actions taken under the mitigation measures alternatives would reduce these emissions, especially PM. For example, paving of 22 mi (37 km) of dirt roads in Imperial County would reduce $PM_{10}$ emissions by about 650 tons/yr (589 t/yr).